

by Hillel Segal and Jesse Berst

How to select your small computer

...without frustration

The Association of Computer Users'
Computer Fitness Series
Volume 1





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...without frustration

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Association of Computer Users'
OFFICIAL
CONSUMER GUIDE
to business computer systems

Prentice-Hall, Inc., Englewood Cliffs, New Jersey

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About ACU . . .

The Association of Computer Users, Inc., is a not-for-profit association with several thousand members in the United States, Canada, and many foreign countries. Further information about membership may be obtained by contacting ACU, P.O. Box 9003, 4800 Riverbend Rd., Boulder, CO 80301, (303) 443-3600.

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Introduction



*Buy The Easy Way . . .
Without Frustration*

Frustration. Aggravation. Confusion.

These are the words most first-time buyers use to describe the process of selecting a small computer. Unhappily, frustration and confusion often lead to expensive buying mistakes. Whether a new computer will generate **profits** or **problems** depends on how carefully it is selected—as thousands of buyers have learned the hard way.

If you prefer to learn the **easy** way, this consumer guide is designed to help. It

will take you step-by-step through the buying process, answering such questions as:

- Should I buy now or wait?
- How much computer do I need?
- How do I find the right software?
- Where do I locate the best vendor?
- What hardware features do I need?
- What guarantees should I expect from the supplier?

No matter what your question, chances are that one of our members has already found the answer. We are the Association of Computer Users (ACU), the nation's largest computer consumer organization. ACU's motto is: It's **smart** to learn from your mistakes, but it's **even smarter** to learn from the mistakes of others. That's why we created this comprehensive guide, which includes buying tips gleaned from thousands of users who have been through it all before.

We designed this volume as a workbook for small computer purchasers. In contrast to other books on the market, our emphasis is distinctly from the **consumer** point of view. For example, here are some of the tools we have assembled to help you buy your small computer without frustration:

- Simple, fill-in-the-blank worksheets for every phase of the purchase. At the end of the book, you will combine the worksheets into a summary sheet that will point you to the computer system that's best for you.
- Warnings of the sales ploys some vendors use against unwary buyers.
- Descriptions of the most common buying pitfalls so you won't repeat them.
- Glossaries of the most important computer terms you will need to know at each stage in the buying process.

What do we mean when we say **small** computers? For this guide, we have defined a small computer as a system where the hardware—the actual equipment—costs less than \$20,000. In many cases, much less.

One word of explanation before we begin. Throughout this book, we urge you to be cautious and conservative. We don't want you to think, however, that we believe automation is a bad idea. On the contrary, we feel that most businesses could benefit from computerization. But to get the benefits, you must get the right one, at the right time, at the right price.

That's where this consumer guide comes in. By the time you're finished, you should have the answers you're looking for—without frustration.

Hillel Segal

Jesse Berst

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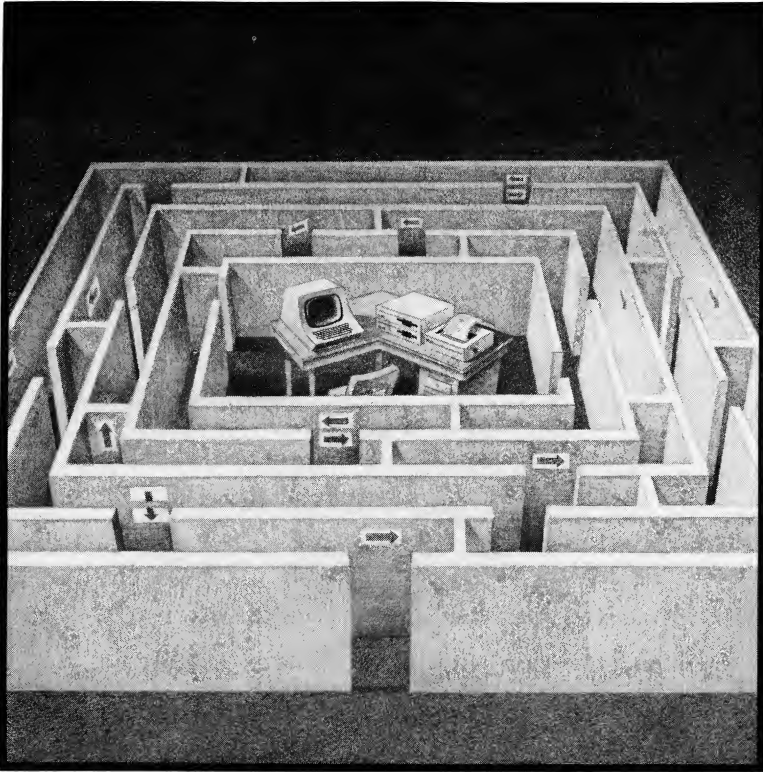
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Chapter One

The Right Way To Buy A Computer

*How To Find
Your Way Through
The Computer Maze*

You **can** buy a computer without frustration.

Despite the confusion you are probably feeling if you've been shopping around, and despite the horror stories you've heard, thousands of people have successfully negotiated the computer marketplace. They have found the right computers at the right prices and put them to work improving profits for their firms.

As an independent consumer organization, we set out to determine the characteristics that separate the successful computer purchases from the bad ones. After significant research, we discovered that most success stories have something in common: the buyers took a few relatively simple steps **before** the purchase.



Out of ignorance, you can easily pay **ten times** as much as you should to computerize your business.



There is, in other words, a right way to buy a computer. Unfortunately, many first-time shoppers go about it the wrong way. Typically, they don't determine if they should buy now or wait; or how much computer they need; or what features they should shop for. Nor do they talk to other users. Instead, they call in a sales rep or two right away. The sales representative hands them some slick brochures and runs through a polished presentation, typically laying heavy emphasis on a demonstration of the hardware's bells and whistles. Most unknowledgable buyers, suitably impressed, decide to buy. Our studies have revealed that most first-time buyers give only two or three systems serious consideration before they buy.

Buying a computer this way can lead to big problems. Although automation usually changes a business for the better, some begin to suffer from the day they acquire the wrong system. Even if a poor buying decision isn't catastrophic, its potential for financial mischief is enormous. Out of ignorance, for instance, you can easily pay **ten times** as much as you should to computerize your business.

We urge you, therefore, to buy your small computer the right way. The four-part process outlined in this book will put you in the driver's seat when you shop.

- SECTION I: **Taking The First Steps.** Decide if you need a computer, how much you need and if you should hire a consultant.
- SECTION II: **Finding The Right Software.** Decide what you need done and find the programs to do it.
- SECTION III: **Finding The Right Vendor.** Locate reputable vendors who sell and service the type of system you want.
- SECTION IV: **Finding The Right Hardware.** Select the best possible hardware to run the software.

Computer systems often come as one big package, but we have broken them down into their components for separate consideration. We urge you to “ease into” automation with a cautious, phased approach that allows you to back out at any stage.



CONSUMER ALERT

Pitfall #1: Buying Backwards

An independent computer consultant recently received a letter from a doctor. The physician had just purchased an IBM computer system. His question: “How can I apply it to my practice?”

This doctor bought his computer system backwards. Not only did he put the cart before the horse . . . he didn't even know if he needed a cart in the first place! We wish we could say this a rare occurrence, but far too many buyers load up a room with equipment before they know what they are going to do with it. Buying a computer

backwards is like buying a car before you know how to drive and before you've decided where you're headed. You may shell out a lot of money to go nowhere.

The smart strategy: Experienced computer users say there is a definite order in which you should buy your system. Begin with the important first steps of deciding if you should computerize and how much computer you need. Next, find the right software and the right vendor. Then, and only then, should you start looking for hardware to run the software you want.

The Moral: If you buy backwards, you'll end up with an expensive solution looking for a problem.

How To Use This Guide

We suggest that you begin by quickly reviewing this entire guide to get the big picture. We have included a small dose of computer jargon at the end of each chapter, so you will know enough to understand most sales representatives. In addition, we've prepared a series of "Tipoffs" to alert you to strategies some vendors use against unwary buyers.

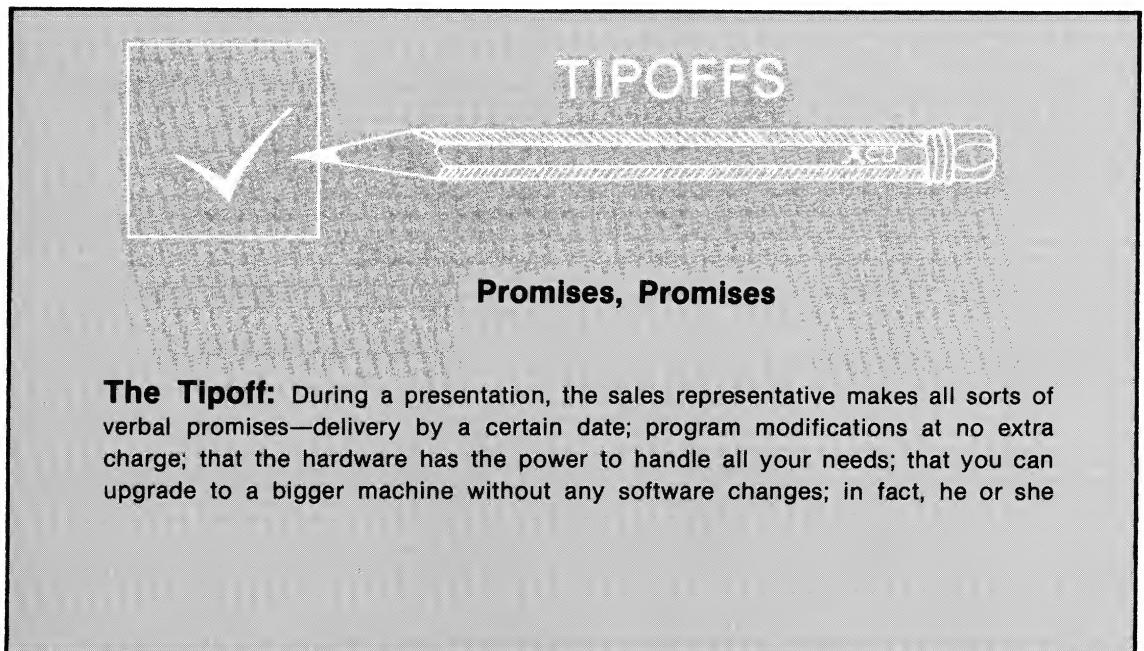
In addition, in each chapter you'll find a series of "Consumer Alerts" to help you avoid common mistakes, and real-life case histories to show how theory translates into practice.

When you've finished your first review, we suggest you then start again from the

beginning to read more carefully and fill in the worksheets. As you work through the chapters, we suggest that you create a special file to store the worksheets and the other sales information you'll collect.

Toward the end of the book, you will discover that the worksheets fit together to become a summary. This important document you'll create is called a **request for proposal (RFP)**, a summary of your needs you can give to vendors to allow them to bid for your business.

Preparing this consumer guide was difficult—it took us months of research and writing—but we won't try to kid you. Our job was easier than yours will be. We had to dig up the best possible advice. You have to follow it, and that involves lots of elbow grease. Our method is not the fastest way to computerize, nor the easiest. But we do believe our method is the wisest and most prudent way to select a small computer. Any major purchase involves risk, but this step-by-step system should steer you clear of many disasters that have tripped up previous buyers—and save you thousands of dollars as well.



TIPOFFS

Promises, Promises

The Tipoff: During a presentation, the sales representative makes all sorts of verbal promises—delivery by a certain date; program modifications at no extra charge; that the hardware has the power to handle all your needs; that you can upgrade to a bigger machine without any software changes; in fact, he or she

promises you almost anything you want—until you ask for it in writing.

The Ripoff: Several recent court cases have awarded damages to computer buyers because the vendor's sales representatives deliberately lied about the capabilities. Although there aren't too many companies who will attempt actual fraud, you will run into far too many sales representatives who "bend" the truth. Unfortunately, when you read through the purchase contract, you'll discover that their glib promises are notably absent.

The Solution: Rely on written promises only—demand a sales agreement that lists all of the vendor's responsibilities.

From Computerese To Computer-ease In Simple Installments

You can't hold your own with a fast-talking computer sales representative unless you can speak a little computerese. Without a basic grounding in technical jargon, you're likely to be snowed under. By placing helpful definitions in each chapter, we're going to review the words you need to know in short installments. We hope that you'll learn as you go along.

Methods Of Acquiring Computer Power

In the most general sense, you have two ways to get computer power for your business: an **outside service** or an **in-house computer**.

There are two basic types of outside services (also called remote computing services). **Service bureaus** have their own large computers. You mail or deliver source documents—checks, sales slips, journal entries—to the bureau on a regular basis. They put the information into their machine, process it, and return the results to you. Some businesses use a service bureau only for one function—payroll, for instance.

Time-sharing is the second type of outside service. It offers you computer power much as an electrical utility offers electrical power—you pay for what you use. A terminal in your place of business is connected by phone lines to a large central computer. Using the terminal, your employees enter information into the central computer, which processes it and returns the results to your video screen or to a printer in your office (some services print the reports in their facility and mail them to you). Every time you dial the main computer, you are charged a fee.

In the last few years, many firms that started with an outside service have switched to in-house computer systems. Sometimes they buy the hardware and software separately. Other times they opt for a **turnkey** system. Supposedly, turnkey systems are so complete that all you need to do is plug them in and "turn the key." Although it's not a bad idea to buy a complete package—hardware, software, service and training—from one vendor, you'll be lucky, indeed, if you find the perfect system for your unique business just sitting in a showroom. Usually, it isn't that simple, as you'll see in our section on software.

2
**Do You
Really
Need A
Computer?**

3
**Should You
Use An
Outside
Service
Instead?**

4
**How Much
Computer
Do You
Need?**

5
**Computer
Consultants**

SECTION I:

Taking The First Steps

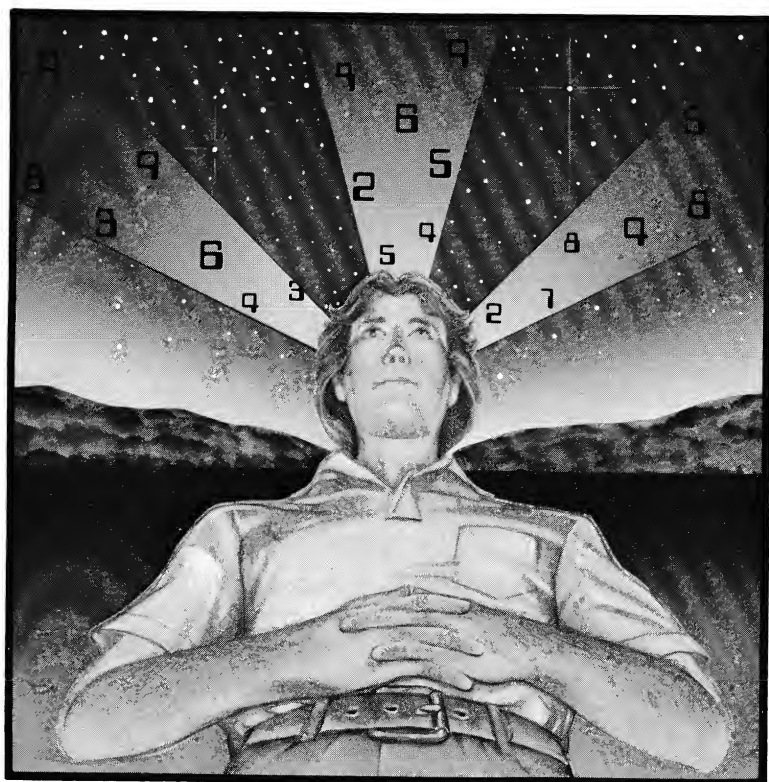
Most first-time computer buyers fail to take the necessary preliminary steps before they start shopping. We'll be honest—these steps will take some effort. But they are worth your time and trouble, because they lay the foundation for a successful computer system.

In Chapter 2 you will make a preliminary decision about computerization. You aren't bound by this decision; you can back out at any stage along the way. But this chapter should let you know if it's worth your while to pursue computerization.

In Chapter 3 you will get an overview of the computer services industry. We've set forth the pros and cons of outside services so you can decide whether you should pick this alternative over an in-house machine.

Chapter 4 is intended for those who have decided to go with in-house equipment. Over- and under-buying are serious problems. The worksheet in this chapter will help you figure out how much computer is enough. The worksheet will eventually become part of your "request for proposal" to tell vendors exactly what you want.

Chapter 5 will explain how consultants work, what they do, when to use them, where to find them and how to get the most for your money.



Chapter Two

Do You Really Need A Computer?

*How To Find Out
With A Simple
Cost-Benefit Analysis*

Do you really need a computer?

Only **you** can answer this question—by doing a simple cost-benefit analysis. In this chapter, we'll show how to go about such an analysis. At the end of the chapter you will find a worksheet to help you complete the exercise step-by-step.

If you have already done some reading about computers, you may be apprehensive that we are talking about a fancy, detailed document like the "feasibility studies" done by large corporations. Such a study just isn't realistic for most small computer applications. That's why our cost-benefit analysis merely asks you to fill in a few blanks. On one side, the costs; on the other, the benefits. Add each side, then check to see which side outweighs the other. If it sounds simple, it is. Once you've got the necessary facts, it probably won't take you more than a

few minutes. (Indeed, getting the facts together may be the hardest part of the whole thing.)

Before we get started, though, we admit that we are prejudiced—even though we have taken an extremely conservative approach to our analysis (much more conservative than most computer sales representatives like to see), we believe that most businesses will find that the benefits outweigh the cost **if**:

- you buy from the right vendor, who can offer service and support when problems arise
- you buy the right software to make the computer pay off
- you buy the right hardware—not too big and not too small

In fact, some experts believe that by 1985 most organizations having \$500,000 in annual sales will require a computer or computer services to remain competitive. Still, you shouldn't care whether **most** businesses need a computer, just whether **your** business needs one. Although our short cost-benefit analysis can't give the final answer, it will reveal if you are a good candidate for computerization.

We want to emphasize that you should not use this chapter's worksheet as the sole basis for your computerization decision. You may still want to go to the time and expense of a more detailed feasibility study performed by your accountant, financial officer, or consultant. But by filling in the blanks of this chapter's worksheet, you will discover whether you are a definite "YES," a definite "NO," or a "MAYBE." If you fall into the "MAYBE" category, you may want to go to the trouble of a more thorough analysis.

Let's now use this "quick and dirty" method of estimating the costs and benefits of a computer system for **your** situation. As we go through the process step-by-step, you may want to refer to the worksheet at the end of the chapter.

Estimating Costs

The costs of computerization vary tremendously from company to company. To

start out, first use the “rule of thumb” method for making an estimate. Later in the buying process, you can replace this estimate with more accurate figures (more on that later).



The rule of thumb estimate represents all costs, including software, hardware, maintenance and all “hidden costs.”



Here's the rule of thumb: Retail and distribution businesses typically spend about 4 percent of gross revenues up to the first \$1 million plus 2 percent of all revenues in excess of \$1 million. Service companies and manufacturers typically spend about 7 percent of the first \$1 million plus 3.5 percent of the excess.

Once you've used our rule of thumb to calculate the total cost, divide by 3 to reflect amortization over three years (even though many leasing and financing arrangements are for as long as 5 years, we feel that it is more reasonable to expect the machine to last just 3 years before it becomes obsolete). After dividing by 3, you'll have the “quick and dirty” annual cost estimate.

Example Number One:

A retail dress shop with 3 locations doing \$2,250,000 annually.

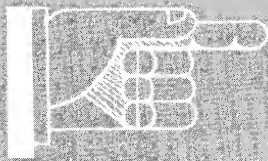
\$1,000,000	(first million in revenues)	
x 4%	(times rule of thumb)	
<hr/>		
\$40,000		
		\$40,000
\$1,250,000	(excess of \$1 million)	
x 2%	(reduced percentage)	
<hr/>		
\$25,000		25,000
		<hr/>
		\$65,000
\$65,000		
÷ 3	(to amortize over 3 years)	
<hr/>		
\$21,666	(annual cost estimate)	

Example Number Two:

A law firm that receives \$250,000 in fees before expenses.

\$250,000	(revenues)
x 7%	(times rule of thumb)
<hr/>	
\$17,500	(total cost)
\$17,500	
÷ 3	(to amortize over 3 years)
<hr/>	
\$5,833	(annual cost estimate)

The rule of thumb estimate represents all costs, including software, hardware, maintenance and all “hidden costs.” Hardware averages about 60 percent of total costs over the life of a system. In the dress shop example above, the \$65,000 total would include in the neighborhood of \$39,000 worth of hardware and the balance in software, service, supplies, insurance, personnel costs, etc.



CONSUMER ALERT

Pitfall #2: Ignoring Hidden Costs

- When a West Virginia heating contractor bought a computer a few years back, hidden costs—including the addition of a special computer room which he was originally told he wouldn't need—drove the price from the expected \$14,000 to nearly \$130,000.
- When an attorney with his own practice bought a computer for word processing, he found that he could not use its time-saving power until all the letters, forms, contracts and other documents had been entered into the system. It took three months of overtime and help from temporary agencies at a cost of \$4,000.
- Just as a Southern California manufacturer was about to sign the contract for a computer system, the vendor casually mentioned that the backup of important files was accomplished by disk packs. The first-year cost of those packs, it turned out, would be about \$8,000—not a dime of which appeared on the original proposal.

Many vendors will not tell you about all the hidden costs of computer ownership, so make sure to ask. Your budget should include all of the items below:

- ALL hardware, including peripheral devices (such as printers and disk storage units), cables and connectors, and initial supplies.
- ALL software, both systems software and applications software—we'll discuss these in depth later on.
- Personnel costs, including recruiting and training.
- Installation costs, including delivery, set up and the rearrangement of existing

office furniture.

- Site modifications, including additional floor space, new wiring, additional outlets, special air conditioning, new furniture, new lights or new window blinds to prevent glare on screens, anti-static floor mats, etc.
- Modifications to forms, procedures, storage files, etc.
- One year's supplies, including backup for disk files, paper, printer ribbons, etc.
- Maintenance, both hardware and software.
- Insurance.
- Conversion costs—entering information from the old system into the computer.
- Parallel operations (using both old and new systems while the new one is being debugged).
- Consultants.
- Finance charges.
- Legal Fees.
- Hardware depreciation.
- Security costs—special vaults for sensitive information, safe deposit box in another location for backups, special locks, etc.
- Diversion of management time.

The Moral: Don't ignore "hidden" costs.

We said earlier that your rule of thumb cost estimate should be replaced by more accurate figures as soon as possible. Where will you get those figures? As you read through this book, you will be able to refine your cost estimate. It's also a good idea to try to find out how much other companies of your size and industry are spending for data processing.

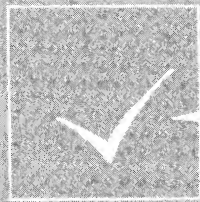
You may find some clues in the case histories later on, but you should also talk

to your industry trade association and—most important of all—to other users. If **you are** a member of the Association of Computer Users, you can call ACU's local contacts in your area; they can often put you in touch with other users.

As you get further along in the process of buying a computer, you will begin to get actual bids from vendors. It may not be a bad idea to come back to this chapter to take a fresh look at costs versus benefits when you can substitute real-life bids for your estimate.

But unless you already have some of these bids, you'll have to use a rough estimate for the time being. Don't forget that it's just an approximation. Keep these cautions in mind:

- This estimate represents what businesses have typically paid in the past—not necessarily what you should pay today.
- Because other businesses could afford this much does not mean that yours can.
- Because other businesses have spent this much does not mean that they got their money's worth.
- These figures are an average and can vary by 50 percent either way.
- The rule of thumb is for a company computerizing all of its key applications. You can spend less than these guidelines by automating one application at a time, expanding gradually. Indeed, we recommend this approach when possible.



TIPOFFS



The "Free" Feasibility Study

The Tipoff: The vendor offers to perform a no-charge feasibility study—a report to establish whether or not you need a computer.

The Ripoff: It seems so obvious, yet buyer after buyer falls for this one. "Free" reports and studies from vendors will be heavily slanted in their favor. They earn their money by selling computers, not by giving you good advice. A typical vendor study exaggerates benefits, overlooks hidden costs and amortizes the cost of the computer over too long a period of time (to reduce the apparent annual cost).

The Solution: It's okay to get help from vendors (*several* vendors; don't rely on just one) in doing the calculations, but make the buy/no buy decision on your own.

Estimating The Benefits

So far in this chapter, you've developed a rough estimate of costs. To complete the analysis, you need to get an idea of the benefits. We suggest that you consider only the benefits from the two or three most important applications in your field. If you ask computer vendors to estimate benefits, they are likely to rattle off a long list of applications. That's usually unrealistic. Most businesses start with a few key applications. When those are successfully up and running, they add more. It often takes years before a computer system is put to full use.

For this reason, we've only given you enough space on the worksheet to list

three applications. If you are new to computers and aren't sure about the key applications for your industry, here are some typical examples:

Accountants:	Client write-up Income tax preparation Time accounting Word processing	Engineers:	Computer-aided design Word processing Job costing
Architects:	Computer-aided design Accounting Time accounting Job costing	Insurance Agents:	Word processing Accounting Quoting
Attorneys:	Word processing Time accounting Accounts receivable Data base access	Managers:	Project management Decision support Financial modeling
Consultants:	Project management Time accounting Word processing	Manufacturers:	Materials resource planning Accounting Payroll
Contractors:	Job costing Payroll	Pharmacists:	Third-party billing Inventory control Point-of-sale
Dentists:	Third party billing Accounts receivable Word processing Client records Appointment scheduling	Publishers:	Word processing Fulfillment Accounting In-house typesetting
Distributors:	Point-of-sale Inventory control Accounting	Realtors:	Investment analysis Property management Accounting Word processing
Doctors:	Third party billing Accounts receivable Word processing Client records Appointment scheduling	Retailers:	Inventory control Accounting Point-of-sale
		Stockbrokers:	Investment analysis Data base access Financial modeling

Calculating The Dollar Amounts of Benefits

Once you know your key applications, you are ready to calculate the dollar benefits from each one. We've listed some applications below along with their typical benefits. You can use these figures to make estimates for your firm.

Locate your applications, and jot down the benefits on the worksheet at the end of the chapter. If one of your key applications is missing, it would be wise to make some calls to other users in your industry to discover the typical benefits for firms like yours.

Accounting

See accounts payable, accounts receivable, general ledger.

Accounts Payable

Typical improvements

- Better cash flow management and other intangibles

Typical labor savings

- 50% reduction in time to prepare and send payments
-

Accounts Receivable

Typical improvements

- Improved bad debt collections by .5% of total annual receivables (Example: If previous bad debt ratio was 5%, new ratio would be 4.5%.)
- 10% reduction in average accounts receivable (cash can be reinvested)

Typical labor savings

- 75% reduction in time to prepare and send statements
-

Client Write Up

Typical improvements

- Better customer service and other intangibles

Typical labor savings

- Varies widely; generally at least 2 hours per week for each accountant
-

Computer-Aided Design

Typical improvements

- More accurate designs, better customer service and other intangibles

Typical labor savings

- Minimum 50% reduction in time to draft plans
-

Financial Modeling

Typical improvements

- Better budgets, plans, etc. and other intangibles

Typical labor savings

- 50% reduction in time to prepare budgets, proforma balance sheets, etc.
-

General Ledger

Typical improvements

- Better control of business and other intangibles

Typical labor savings

- 50% reduction in bookkeeping expense
-

Income Tax Preparation

Typical improvements

- Double the case load each accountant can handle at tax time, better customer service

Typical labor savings

- 30% reduction in preparation time
-

Inventory Control

Typical improvements

- Reduce inventory by 5% while maintaining same level of sales
- Increase sales by 1.5% by identifying and concentrating on high-profit items while eliminating slow-movers

Typical labor savings

- Varies widely
-

Job Costing

Typical improvements

- Spot problems sooner, better use of expensive labor and materials, other intangibles

Typical labor savings

- 50% reduction in time to prepare project reports
-

Payroll

Typical improvements

- Intangible

Typical labor savings

- 75% reduction in time to produce payroll checks and post to ledger and job cards
-

Point-Of-Sale

Typical improvements

- Better customer service and other intangibles
- Increase gross profit margin 1% by reducing pricing errors

Typical labor savings

- Varies widely
-

Word Processing

Typical improvements

- Better looking reports and letters, fewer spelling errors, better business image and other intangibles

Typical labor savings

- 50% reduction in typist expense (doubles typists' output)
-

Your remaining job is to translate the typical benefits on the list above into an estimate of the savings you would realize at your firm. We have provided two examples against which you can judge your own situation. If you are not clear how the process works, you may want to ask your accountant for help in preparing the worksheet.

Example #1

The ABC Dental Clinic has four dentist as partners. Together they gross \$500,000, of which \$100,000 is paid in cash and the balance on account. They employ two clerical personnel. These two employees spend a total of 60 hours per month on various word processing chores: reminder notices, third-party billing, collection letters, correspondence, etc. They spend an additional 26 hours per

month to prepare and send statements to customers with outstanding bills.

The clinic has determined that its top two applications are accounts receivable and word processing. Here is how the clinic's worksheet might look.

WORKSHEET #1	COST-BENEFIT ANALYSIS
<p>COMPANY NAME: <u>ABC Dental Clinic</u></p> <p>ANNUAL SALES: <u>\$500,000</u></p> <p>AVERAGE INVENTORY: <u>n/a</u></p> <p>TOTAL ANNUAL ACCTS. RECEIVABLES: <u>\$400,000</u></p> <p>AVERAGE ACCTS RECEIVABLE: <u>\$100,000</u></p> <p>ANNUAL ACCOUNTING CHARGES: <u>n/a</u></p> <p>AVERAGE COST PER HOUR CLERICAL HELP: <u>\$10/hr (incl. benefits)</u></p> <p>AVERAGE COST PER HOUR OWNER'S TIME: <u>\$50/hr.</u></p>	
<p>Costs</p> <p>Rule of thumb estimate: Retail and distribution businesses—4% of first \$1 million revenues, 2% of excess. Service and manufacturing businesses—7% of first \$1 million revenues, 3.5% of excess. Divide by three to amortize over 3 years.</p> <p>Revenues less than \$1 million: times rule of thumb %: <u>500,000</u> Subtotal A: <u>\$36,000</u></p> <p>Revenues greater than \$1 million: times rule of thumb %: <u>n/a</u> Subtotal B: <u>35,000</u></p> <p>Subtotal A: plus Subtotal B: Total Cost: <u>\$35,000</u></p> <p>Total Cost: divide by 3: Annual Cost Estimate: <u>\$11,667</u></p> <p>Total Annual Costs: <u>\$11,667</u></p> <p>(Continued)</p>	

WORKSHEET #1	COST ANALYSIS (Continued)
<p>Benefits</p> <p>Application #1: <u>Accounts Receivable</u></p> <p>Improvements: 1) <u>Improve bad debt ratio by 5%</u> <u>\$400,000 x 5% = \$2000</u></p> <p>2) <u>10% reduction in average A/R</u> <u>100,000 x 10% = 10,000 x 15% = \$2,340</u></p> <p>Labor savings: 1) <u>76% reduction in clerical time</u> <u>26 hrs. x 75% = 19.5 hrs. @ \$10/hr</u> <u>= \$195/month or \$2,340/year</u></p> <p>Application #2: <u>Word Processing</u></p> <p>Improvements: <u>intangible</u> \$ _____</p> <p>Labor savings: <u>50% reduction in typist expense</u> <u>60 hrs. x 50% = 30 hrs. @ \$10/hour</u> <u>= \$300/month or \$3600/month</u></p> <p>Application #3:</p> <p>Improvements: \$ _____</p> <p>Labor savings: \$ _____</p> <p>Total Annual Benefits: <u>\$9,440</u></p> <p>Total Net Benefits (total benefits less total costs): <u>\$ < 2,227 ></u></p>	

As you can see, the ABC Dental Clinic is a border-line case. At the moment it does not appear that the computer has a good chance of paying off. We would not recommend that ABC take the time and risk to computerize now unless it can more clearly establish the benefits.

That does not mean, however, that ABC should forget about computerization

altogether. It has several alternatives. Because benefits are reasonably close to costs, it might want to get some actual bids. If actual costs are less than estimated costs, a computer still might make sense.

Or the clinic could get its feet wet by using a service bureau for some of its applications while waiting for computer prices to drop.

Or the clinic might choose to computerize one application at a time. If it shopped for an easily expandable system it might be able to start with a low-cost computer for only one application, then expand into other applications after the original purchase has paid for itself.

Or, finally, ABC might be better off to forget about computerization for the time being and concentrate on improving its manual procedures.

What About Intangible Benefits?

When you talk to computer vendors, they will mention the benefits explained in this chapter. They may also try to sell you on the basis of **intangible** benefits, things that can't be measured in dollars and cents:

- better service
- faster response to customer inquiries
- better looking correspondence
- an improved company image
- more and better management reports

You shouldn't ignore intangible benefits. In the long run, they may be the most important of all. Keep them in mind when shopping for a system.

But intangible benefits are not automatic or immediate. We suggest you justify your purchase on the basis of the bottom line. Consider only measurable, short-term benefits. Even when you take this hard-nosed approach, you will probably find that a computer can pull its own weight.

To sum up: When deciding what to use for your analysis, choose the two or three **tangible** benefits that are most critical to your business. If you can't justify a system on this basis, you probably shouldn't buy one yet.

Example #2

The XYZ Hardware Store does about \$1,600,000 in sales each year. Eventually, the owner wants to automate all accounting, but he realizes that the bulk of his capital is tied up in inventory, so he has chosen to start with inventory control, point-of-sale and accounts receivable.

Here is what the store's worksheet might look like. Although a retail outlet, XYZ does a good portion of its business with contractors who pay on credit. Its clerks spend 35 hours per month on accounts receivable.

WORKSHEET #1	COST-BENEFIT ANALYSIS																								
<p>COMPANY NAME: <u>XYZ Hardware</u></p> <p>ANNUAL SALES: <u>\$1,600,000</u></p> <p>AVERAGE INVENTORY: <u>\$400,000</u></p> <p>TOTAL ANNUAL ACCTS. RECEIVABLES: <u>\$600,000</u></p> <p>AVERAGE ACCTS. RECEIVABLE: <u>\$150,000</u></p> <p>ANNUAL ACCOUNTING CHARGES: <u>n/a</u></p> <p>AVERAGE COST PER HOUR CLERICAL HELP: <u>\$8/hr (incl. benefits)</u></p> <p>AVERAGE COST PER HOUR OWNER'S TIME: <u>n/a</u></p>																									
<p>Costs</p> <p>Rule of thumb estimate: Retail and distribution businesses—4% of first \$1 million revenues, 2% of excess. Service and manufacturing businesses—7% of first \$1 million revenues, 3.5% of excess. Divide by three to amortize over 3 years.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Revenues less than \$1 million:</td> <td style="text-align: right;">\$1,000,000</td> </tr> <tr> <td>times rule of thumb %:</td> <td style="text-align: right;">x 4%</td> </tr> <tr> <td>Subtotal A:</td> <td style="text-align: right;">\$40,000</td> </tr> <tr> <td>Revenues greater than \$1 million:</td> <td style="text-align: right;">600,000</td> </tr> <tr> <td>times rule of thumb %:</td> <td style="text-align: right;">x 2%</td> </tr> <tr> <td>Subtotal B:</td> <td style="text-align: right;">\$12,000</td> </tr> <tr> <td>Subtotal A:</td> <td style="text-align: right;">40,000</td> </tr> <tr> <td>plus Subtotal B:</td> <td style="text-align: right;">12,000</td> </tr> <tr> <td>Total Cost:</td> <td style="text-align: right;">\$52,000</td> </tr> <tr> <td>Total Cost:</td> <td style="text-align: right;">52,000</td> </tr> <tr> <td>divide by 3:</td> <td style="text-align: right;">17,333</td> </tr> <tr> <td>Annual Cost Estimate:</td> <td style="text-align: right;">17,333</td> </tr> </table> <p style="text-align: right; margin-top: 10px;">Total Annual Costs: <u>\$ 17,333</u></p> <p style="text-align: right; font-size: small;">(Continued)</p>		Revenues less than \$1 million:	\$1,000,000	times rule of thumb %:	x 4%	Subtotal A:	\$40,000	Revenues greater than \$1 million:	600,000	times rule of thumb %:	x 2%	Subtotal B:	\$12,000	Subtotal A:	40,000	plus Subtotal B:	12,000	Total Cost:	\$52,000	Total Cost:	52,000	divide by 3:	17,333	Annual Cost Estimate:	17,333
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Total Cost:	52,000																								
divide by 3:	17,333																								
Annual Cost Estimate:	17,333																								

WORKSHEET #1	COST ANALYSIS (Continued)
<p>Benefits</p>	
<p>Application #1: <u>Inventory Control</u></p> <p>Improvements: <u>Reduce inventory by 5%</u> \$ 3,000</p> <p style="margin-left: 100px;">$\\$400,000 \times 5\% = 20,000 \times 15\%$</p> <p style="margin-left: 100px;">interest rate = 3,000</p> <p>Labor savings: <u>Increase sales by 1.5%</u> \$ 7,200</p> <p style="margin-left: 100px;">n/a $1,600,000 \times 1.5\% = 24,000 \times 30\%$</p> <p style="margin-left: 100px;">profit margin = \$7,200</p>	
<p>Application #2: <u>Point of Sale</u></p> <p>Improvements: <u>1% increase in gross profit margin</u> \$ 16,000</p> <p style="margin-left: 100px;">$\\$1,600,000 \times 1\% = \\$16,000$</p> <p>Labor savings: \$</p>	
<p>Application #3: <u>Accounts Receivable</u></p> <p>Improvements: <u>1) Improve bad debt ratio by 5%</u> 10,250</p> <p style="margin-left: 100px;">$1,600,000 \times .5 = \\$8,000$</p> <p style="margin-left: 100px;">2) <u>10% reduction in average A/R</u> 2,520</p> <p style="margin-left: 100px;">$150,000 \times 10\% = 15,000 \times 15\%$</p> <p style="margin-left: 100px;">interest rate = 2,250</p> <p style="margin-left: 100px;">3) <u>15% reduction in clerical time</u></p> <p style="margin-left: 100px;">$35 \text{ hrs.} \times 75\% = 26.25 \text{ hrs. @ } \\$8/\text{hr.} =$</p> <p style="margin-left: 100px;">$210/\text{mon.} \text{ or } \\$2520/\text{year}$</p>	
<p style="text-align: right;">Total Annual Benefits: <u>\$ 38,970</u></p> <p>Total Net Benefits (total benefits less total costs): <u>\$ 18,303</u></p>	

As you can see XYZ Hardware is a strong candidate for computerization. Although the owner might still want to perform a more sophisticated analysis later, it would certainly be worth his while to thoroughly investigate computerization.

Summary

Here's our cost-benefit analysis in a nutshell. You begin with a rule of thumb estimate of the total cost. Then, divide the total cost by 3, to spread it over a 3-year period and give you the annual cost.

Next, choose the most important application areas for your industry and list them on the benefits portion of the worksheet. Translate each of the benefits into an annual dollar amount as shown in the examples. Finally, add up the benefits and compare their total to the cost.

Remember that this chapter's worksheet is not the final word in determining if you should get a computer. To keep things reasonably simple, we have left out other costs like staff training expenses and diversion of management time. We have left out possible benefits like tax credit and depreciation. And we have not used sophisticated analysis techniques such as present value of future income. Such additional factors can be taken into account if you decide to go ahead with a more sophisticated feasibility study with the help of your accountant or a consultant—but it is not necessary to do so at this early stage.

What if your cost-benefit analysis **doesn't** favor computerization? You have two choices: You can wait until prices come down further, or you can computerize a portion of your operation via outside computer services. You'll find more about the pros and cons of computer services in our next chapter.



CASE HISTORY

WHAT CAN I LEARN?

Courtney's 27th Street Drug Company

Although many first-time computer buyers make expensive mistakes, this case history tells the happy story of a beginner who did things the right way. He shopped around carefully before he bought; he justified his purchase on the basis of one key application; and he is taking a gradual, "phased" approach to installation.

Courtney's 27th Street Drug Company has a single location in East St. Louis, Illinois. According to president Richard Quayle, the pharmacy fills about 200 prescriptions per day. Roughly 80 percent of his business comes from various public aid programs that reimburse patients for medicine costs. These programs demand a tremendous amount of paperwork—an ideal application for a computer.

Even though he knew his business was ripe for automation, Quayle did not jump right in. He shopped around carefully, looking at more than 40 systems before he found the best one for his needs. He was cautious because he had seen other pharmacists get burned by careless buying.

"One important criteria was ease-of-use," said Quayle. "Many systems use code numbers for the different drugs, doctors, and customers. That makes everything cumbersome and inefficient. I wanted a system that could access everything by name, or even by partial name if I wasn't sure of the spelling." Quayle also wanted a system that would be large enough to handle his future needs. He had seen other pharmacies go way over their computer budgets because their original systems were too small. Some of them had to buy additional components, or even start all over with a new, larger machine.

Because he was so diligent in his shopping, he was able to find an easy-to-use system with lots of excess capacity. And he was able to find it at about one-half the price many of his fellow pharmacists were paying for the same amount of computer power. His final choice was a \$22,500 MSI 80W from Mayberry Systems of Belleville, Illinois.

Although the computer is capable of automating his entire business, Quayle wisely chose to concentrate his first efforts on his key application—prescriptions. All prescriptions are now entered immediately at the terminal. The system shows the

pharmacist a customer profile on the screen, which helps him keep track of each individual's usage patterns, allergies, and special conditions. It calls up the drugs and displays the current price. Then it prints out the labels and the paperwork for any of 18 different welfare and insurance plans that might apply.

The system is already saving time. Quayle estimates that it formerly took about 8 hours to do what the computer now does in about 45 minutes at the end of the day. And the system pays off in another way, too. Quayle quickly discovered that he had been losing hundreds of dollars each month because of pricing errors. Now that the computer keeps track of prices automatically, his only job is to enter the latest changes when they arrive once a month.

With the basic prescription system working smoothly, Quayle is moving on to additional applications. The system has the capacity to warn the pharmacist of possible drug interactions. It can also track inventory levels and warn when it is time to reorder. He has held off on these applications, however, because of the time it takes to get them started. For each of the thousands of drugs he keeps on hand, Quayle will have to go through and make decisions about the level of inventory he wants to keep and about which drug interactions he wants the computer to warn him of.

"Setting up the computer is always one of the biggest problems," Quayle cautions, "and it's something many users don't realize. You have to enter all your records and information, and then you have to tell the computer what you want. It can take months."

Once the system is working completely, Quayle expects to be able to reduce his inventory. Since he will be warned whenever it is time to reorder, he won't have to keep as much on hand to guarantee availability. He already gets a variety of management reports, and, as he adds applications, he will get even more tools to give him better control over his business.

Nor does he plan to stop there. "As soon as I get one thing going well, I'm going to add the next," he said. "I'm going to keep it up until I am getting full value from the equipment." Future plans include word processing and accounts receivable.

These additional applications aren't mandatory, though, since Quayle wisely justified his system on his key application. Knowing that prescriptions were the most important part of his business, he made sure that the computer would pay off there, whether or not he eventually extended it to other areas.

His strategy worked. "Even though my dollar sales volume did not increase," said Quayle, "my profits went up. The computer paid for itself in less than one year. From now on, everything I add is just another bonus."

WORKSHEET #1 (a)**COST-BENEFIT ANALYSIS**

COMPANY NAME: _____

ANNUAL SALES: _____

AVERAGE INVENTORY: _____

TOTAL ANNUAL ACCTS. RECEIVABLES: _____

AVERAGE ACCTS. RECEIVABLE: _____

ANNUAL ACCOUNTING CHARGES: _____

AVERAGE COST PER HOUR CLERICAL HELP: _____

AVERAGE COST PER HOUR OWNER'S TIME: _____

Costs

Rule of thumb estimate: Retail and distribution businesses—4% of first \$1 million revenues, 2% of excess. Service and manufacturing businesses—7% of first \$1 million revenues, 3.5% of excess. Divide by three to amortize over 3 years.

Revenues less than \$1 million: _____
 times rule of thumb %: _____
 Subtotal A: _____

Revenues greater than \$1 million: _____
 times rule of thumb %: _____
 Subtotal B: _____

Subtotal A: _____
 plus Subtotal B: _____
 Total Cost: _____

Total Cost: _____
 divide by 3: _____
 Annual Cost Estimate: _____

Total Annual Costs: \$ _____

(Continued . . .)

WORKSHEET #1 (b)

COST-BENEFIT ANALYSIS

Benefits

Application #1:

Improvements: \$ _____

Labor savings: \$ _____

Application #2:

Improvements: \$ _____

Labor savings: \$ _____

Application #3:

Improvements: \$ _____

Labor savings: \$ _____

Total Annual Benefits: \$ _____

Total Net Benefits (total benefits less total costs): \$

From Computerease To Computer-ease In Simple Installments

As you begin to explore automation, your first source of confusion may be the different kinds of computers. Here are a few definitions that may help you.

Types of Computers

Chip. Also called "microchip." Vendors may talk to you about the type of "chips" inside their machines. A chip is not a computer itself, but a fingernail-sized piece of silicon etched with thousands of tiny circuits.

Eight-bit. Describes the "word size" of a computer. In very general terms, the larger the word size, the more information a computer can "swallow" at one time and the faster and more powerful it is. Many small computers are eight-bit machines, but more and more sixteen-bit models are coming onto the market.

Home Computer. A microcomputer intended for games and home entertainment. Programs are generally stored on cartridges or cassette tape. Home computers usually have limited expansion potential and are not suitable for business use, even in a one person firm.

Local Network. When small computers at a single location are connected together. A local network allows computers to talk to each other and to share resources—to share printers, to share programs, to share a hard disk memory. Although you may not need it to begin with, a machine that can expand in this manner will have a longer useful life.

Mainframe. A large, complex computer costing upwards of \$150,000. IBM is the best known maker of mainframe computers.

Microcomputer. Often called a "micro." A small computer based around a single microprocessor. The distinction between **micro**computers and **mini**computers is very hazy. In the past most micros had eight-bit chips; most minis had sixteen-bit chips. But that is no longer the case. Most dealers arbitrarily call it a microcomputer if it costs less than \$15,000 for a complete system; a minicomputer if it costs from \$15,000 to \$150,000; and a mainframe if it costs more than \$150,000. A microcomputer can be a home computer, a personal computer, a small business computer, or a word processor.

Microprocessor. A type of chip. Some computers have a number of chips at their core. When all the processing circuitry is on a single chip, it is known as a microprocessor.

Minicomputer. Often called a "mini." Generally speaking, a computer that costs between \$15,000 and \$150,000. They are often (but not always) more powerful than microcomputers.

Personal Computer. A microcomputer intended for use by a single person. Although some personal computers can be adapted to fit into local networks, they are designed as standalone units. Their primary applications are in small businesses, and for executives and managers of large corporations. The Apple and the IBM Personal Computer are two well-known examples.

Sixteen-bit. Describes the word-size of a computer. In theory, a 16-bit computer is about four times as powerful as an 8-bit machine. In practice, however, we have not seen dramatic performance differences between them for most small business applications.

Small Business Computer. Often abbreviated "SBC." A microcomputer intended for use by small businesses. Most SBC's share these characteristics: at least 64K of RAM memory; at least two floppy disk drives; an optional hard disk; capable of using the CP/M operating system. (These terms will be explained later.)

Word Processor. A microcomputer intended for "word processing" applications, such as letters, manuscripts and reports. The distinction between word processors, personal computers and small business computers is starting to blur. In the past, word processors were standalone machines that could not do anything but automated typing. More recent models, however, can be placed in local networks and are capable of mathematical computations, data base management, and accounting functions. Prices range from \$4,000 to \$15,000 for a complete system, including letter-quality printer.



Chapter Three

Should You Use An Outside Service Instead?

Although this book is devoted to choosing an in-house computer, buying your own equipment is not always the best alternative. Perhaps the cost-benefit analysis we suggested in the previous chapter was inconclusive; or perhaps the analysis favored computerization, but you just don't want the headaches of your own machine; or perhaps you only want to automate one or two applications for the time being.

In such cases, your best alternative might be to let someone else own the computer, at least for a while. We feel most businesses should seriously consider using outside computer services **before** they start shopping for equipment of their own. In this chapter, we will look at the pros and cons of outside services so you can determine if your firm should look further into this alternative.

There are two types of outside services. A **service bureau** processes

information that you mail or deliver to it. A **time-sharing service** puts a terminal in your place of business and connects you by phone line to its central computers; you pay for the computer time you use. Both types offer just about anything you can do with an in-house computer. In addition to the standard accounting applications, you can purchase anything from sales analysis to mailing labels to financial modeling. (**Note:** Although some service companies offer word processing programs, word processing can rarely be done effectively on a service.)



CONSUMER ALERT

Pitfall #3: Buying For The Wrong Reasons

The reason given by one retailer for buying a small computer was "my biggest competitor has one." He figured it "was time to get started in computers." Yet the machine has stood unused in a corner since its purchase. Although the company had the money for the hardware, it couldn't afford the expensive custom programs necessary to put it to use. The store's major competitor is a larger operation with a dozen outlets. It could afford custom programming because the cost was spread among its 12 stores. The single-location retailer, however, didn't have that leverage.

Before you buy, take a close look at your motives. "Status" or "keeping up with the Joneses" should not play a part. Your competitors and friends may have different needs. What's more, their computer purchase may have been a failure. By adopting a follow-the-leader strategy you may repeat someone else's mistakes.

The Moral: The time to automate is when your business is running smoothly on manual procedures and you see a chance for a computer to **make you more money**.

The Advantages Of Outside Computer Services

An outside service is one way for you to get a data processing education. Many well-intentioned people don't know enough about computers to shop intelligently. They trust "luck" to get the right system.

But luck often lets them down. Some firms have had to scrap their first computer and start all over again. Data processing is a complex subject. Even though you don't need to know how a computer works to buy one, you do need a basic understanding of what computers can and can't accomplish.

An outside computer service lets you get your feet wet without jumping in over your head. You and your staff get a basic grounding in data processing fundamentals, without obligating yourself to a big outlay for in-house equipment. You can be assured of getting an "education" because of the customer support that is the hallmark of the services industry. Most service firms provide excellent manuals and training. You can start small with just a few applications and build up gradually. When you eventually shop for an in-house computer, you'll know what features to look for.



**An outside service lets
you get your feet wet
without jumping in
over your head.**



Outside services have other advantages, too, because they offer the help of a computer without the headaches. You are “renting” a sophisticated, field-tested system that would cost a small fortune to duplicate; this is particularly true with service firms that specialize in a given industry.

Moreover, you can choose from thousands of programs currently available. Built up over the years and previously used by hundreds or even thousands of people, these programs are thoroughly debugged. You can feel confident that you won’t have to spend months fixing the software, in contrast to the situation you may face with an in-house machine.

Another big plus: You don’t have to buy any equipment. Think about it for a minute. If you buy a computer, what happens if the equipment goes down—will your business shut down, too? What if your operator quits and you can’t find someone else? Some business owners decide they’d rather let someone else worry about keeping the equipment running, debugging the software, paying for disaster insurance, planning for obsolescence, finding personnel, and all the other problems of ownership.

Outside services also save time, particularly in the beginning. In-house systems typically take many months to bring on board. An outside service can have an application up and running in weeks, sometimes days. And the firm will “hold your hand” through the entire process—an important benefit for novice users.

Using an outside service allows management to make better use of its time. One retail firm we know, for example, switched to an outside firm after running an in-house shop for over seven years. The firm had become a revolving door where data processing employees were trained and then moved on to greener pastures. Finding new personnel was a constant headache. They finally decided they did not want to be in the computer business. Management now concentrates full time on retailing and lets an outside company worry about computer-related problems.

IDEAS YOU CAN USE

How To Choose An Outside Service Company

When shopping for an outside service company, look for a record of solving business problems like yours. The firm you choose should specialize in the applications you need. Don't pay a firm to learn on your time. If it claims it can solve your business problems, make it prove that it has done it before for people in your industry. Get the names of former customers and call a few.

If you will be moving on to an in-house computer some day, you may want a service firm that will help you make that transition. Certain service firms sell in-house systems as well as remote services. They can start you out with services, then move you up to in-house equipment when the time is right.

When this is done, your new in-house machine will likely use the same software as the former remote service, so retraining and conversion costs are kept to a minimum.

If the service firm doesn't sell hardware, it should at least have provisions for change. In the past, a few service firm customers have been disappointed to learn that they couldn't get their data out when it came time to leave. They had to re-enter all the information manually into their new system, a process that can take weeks. Look for vendors who will return your records on magnetic tape or disk so that you are saved the hassle and expense of keying it again.

If you are going to pay a service company to write or modify programs for you, try to make sure that (1) you will own them and (2) they are written in a language that is easy to transfer to another system. We know companies that spent large sums for programming and were devastated to discover they couldn't take the software with them when they left the service company.

Be wary of computer owners who have decided to lease some of their extra computer power to others in their industry. Although these "home-grown" service companies occasionally offer genuine bargains, they are also responsible for a good share of the horror stories. Data processing is not their primary business; your requirements will always be second to theirs.

You should also consider these factors:

Documentation. Are the instruction manuals easy to read and understand?

Training. How will the service company educate your personnel? Where will classes

be held? Will they cost extra?

Multi-locations. Can the service firm handle multiple stores or warehouses?

Location. You don't care where the central computer is located, but you should expect nearby support and service personnel.

Telephone access. Is local dial-up access available from all your locations? If not, you will have to go to the expense of leased lines or long-distance calls.

Size and resources. Can the service company grow with you? How long has it been in business? How long has it been serving customers in your industry?

Modifications. What happens if you want to add new reports or change procedures? Will the service firm accommodate your wishes or are you stuck with their "plain vanilla" product? How much do they charge for programming changes? How long does it take for minor modifications?

Cost. The computer services industry is highly competitive, so you should expect the best firms to give you a price that is as good as the rest. Get all charges quoted in advance, and get as many proposals as time and patience permit. Contact national firms as well as local operations.

Service hours. When is it open for business? Is the computer available for use 100 percent of that time? Some users have been unpleasantly surprised to find that their time-sharing service was not available during the full working day. (This sometimes happens because of time zone differences between the user and the central computer.)

Response time. For a service bureau, ask if the company will guarantee the turnaround time (e.g., all payroll checks returned within three days). For a time-sharing service, will the company guarantee to keep response time within certain guidelines (e.g., within 3 seconds on 90 percent of all transactions)?

Protection. How are the security and integrity of your data protected?

- Are there backup hardware systems?
- Is there an uninterruptible power supply?
- Does the company perform security audits on a regular basis?
- Is password protection available?
- Is your data stored in duplicate? Is it identified and stored separately?
- Do you have the right to review and approve security procedures?

After rating companies on the basis of their answers to the questions above, choose the top two or three candidates and then (1) go for a test drive on each one, and (2) get formal proposals with detailed cost estimates before making a final decision.

The Disadvantages of Outside Computer Services

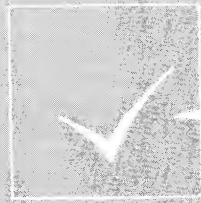
Despite their benefits, outside services have drawbacks, too.

Waiting time is one handicap. You must bend your schedule to meet theirs. With a service bureau, for example, you wait while your transaction documents are delivered and processed and your reports are sent back. This period, known as turnaround time, can be overnight if you are willing to pay a premium, but usually averages three to four days. Delays are a common complaint, and so are errors. Some customers get caught in a vicious circle: send in data, wait for it to come back, fix mistakes, then do it all over again.

As for time-sharing services, they often experience crowded conditions during peak demand hours. Response time may drop dramatically or you may even get a busy signal and be unable to use the system at all. Many smaller firms are only open for business during the day, a problem if you have an occasional need for overtime or if you decide to add an evening shift. And if you are in one time zone and the mainframe computer is in another, you may not have access for the full working day.

Here's another potential disadvantage—your data files and programs remain on the service's computer, along with many other customers' records. Not everyone likes the idea of trusting another firm with important data about sales figures, salaries, profits and so on. In a few cases, service firms have gone bankrupt and creditors have seized the facilities, including customers' data and tapes.

Another drawback: Service firms can be inflexible. Although they offer sophisticated software, their programs are not tailored specifically to **your** business. It's difficult—sometimes impossible—to deviate from their “plain vanilla” software. Either you change the way you do business, or you pay for expensive program modifications.



TIPOFFS

The Showcase

The Tipoff: A vendor, software house or outside service company offers to give you a special price because they want to make your installation a "showcase."

The Ripoff: You've probably run into a firm that sees an opportunity to break into a new market—and needs a guinea pig. You will be financing someone else's research and development project while paying more than you would for an established, field-tested service or packaged program.

The Solution: Never be the first one on the block with a new computer system or program. Insist on proven products.

The Drawback Of Cost

We must also add **cost** to our list of disadvantages. When it comes to automating one or two applications, outside services are usually less expensive than an in-house computer when you add in all the "hidden" costs of ownership like depreciation, diversion of management time, staff training, insurance, etc. But if you computerize more than a few applications, a well-run, fully-utilized in-house computer is almost always a better buy over the long run.

For example, if you want to expand to other applications, you will incur additional charges from a service company. If you own a computer, on the other hand, you can often expand for no more than the price of a new software

package . . . sometimes as little as a one-time fee of a few hundred dollars.

Time-sharing services are particularly apt to become extremely expensive. Forty to sixty dollars **per hour** in charges is not unusual, leading to enormous monthly bills. Time-sharing is generally best for those who need the high power of a large computer; engineers, for example. Otherwise, an in-house computer is generally more cost-effective.



You may want to use
certain outside services
even if you purchase
an in-house computer.



Who Should Use Outside Services?

Given our list of pros and cons, who should use outside computer services? The best candidates are first-time users. An in-house system may be too much for them to tackle and still keep up with the other aspects of their businesses. In terms of time and money, an outside service usually has the lowest **threshold cost**. You can try out data processing without a big capital investment and without becoming irrevocably committed. For many businesses, it's a good transition step that helps them put their records and accounting into a form that is convenient for a computer.

You should also investigate an outside service if you just don't want the responsibility of owning and operating your own equipment. An in-house computer demands management resources, gobbling up time for the many months it takes to get up and running. After it is producing, you still have to oversee its operation. These tasks are doubly difficult if you know nothing about computers when you start.

And you should shop for an outside service if you need rapid automation. If you are swamped by an unexpected upsurge in business, if you see an immediate opportunity for expansion, or if your competitors have automated and you are no longer able to keep up, you may want to go outside for computer power. At the very least you will buy yourself some extra time to carefully shop for an in-house system.

Finally, you may want to continue to use certain outside services even if you purchase an in-house system. Sometimes tax preparation and payroll costs less if handled by another firm, because such programs must be constantly modified to keep up to date with changes in government regulations.

So keep in mind that sometimes owning a computer **isn't** the answer. You don't always have to install your own system to gain the benefits of automation. Before you sign a contract for an in-house machine, it's a good idea to get bids from several service companies for comparison.



CASE HISTORY

WHAT CAN I LEARN?

Griffin Hardware Co.

"Buying a computer is one of the best things we have ever done," says Bill Griffin. "It has added substantially to our margin. But more than that, it has increased our awareness of our business."

Griffin is vice-president of Griffin Hardware Co. of Santa Ana, California. Although he is glad he computerized, he admits that it was a long, hard road. The store started out by purchasing computer hardware, then paying a contract programmer to write custom software for it. After several years, though, the store management grew so frustrated with the hassles and expense of custom programming that it junked most of its original software and switched to a turnkey system sold by Triad.

"Our system is continually changing," explained Griffin. "We wanted to take that off our shoulders. We're not in the computer business, so we're better off concentrating on our jobs and letting a computer company do the research." Griffin admits that working with contract programmers was the worst part of the computerization process. "It's like they live in another world," he complained. "You tell them what you want, and they come back with something completely different. So then you start over again—at your expense, of course."

Griffin Hardware now operates with three back office CRT terminals and four NCR point-of-sale terminals hooked up to the Triad system. He estimates the total cost at about \$50,000. The NCR terminals capture sales data on cassette and feed it into the computer once each day.

The system is a tremendous time-saver. "We have about 500 active accounts," he said. "Before we got a computer it took three to four days to send and age our accounts receivable. Now it takes three to four hours. We can go right up to the end of the month. We get an accurate finance charge reported and we get an aged trial balance whenever we want it. We usually screen it three times per month and call the slow payers. The number of 90-days-and-over accounts has dropped dramatically."

Griffin is also happy about the time he can save in purchasing. "We can basically do our weekly order in 1 to 2 hours on the floor," he said. "The machine gives us the items that it thinks should be reordered. Our floor people verify the quantities, make adjustments as necessary, then tell the computer and it writes up the order."

Although Griffin credits the computer with impressive improvements in inventory turnover (from 2½ times per year to 4 times per year), he claims that there has been an even more important benefit. "The money we saved from price changes alone paid for the computer in one year!" he enthused. The computer gives management an exception report that lists all mispriced items. "We were stunned the first time at how many items were being sold at the wrong price. The price changes had been issued, but not done on the floor. Now with the exception report, our people have an incentive to get the work done—they know we will find out if they don't."

Bill Griffin believes other small retailers can benefit from computerization, as long as they are prepared to spend the time to do it right. "No matter what anybody says, you can't just plug it in and run it. It's a very tedious, very time-consuming, very frustrating procedure to get an entire system up and running."

From Computerese To Computer-ease In Simple Installments

Although it's important to judge a computer system as a total package, software is the most important part of that package. With the right software, your computer is a valuable tool. Without it, it's just a dumb hunk of iron. Here are a few important terms you should understand.

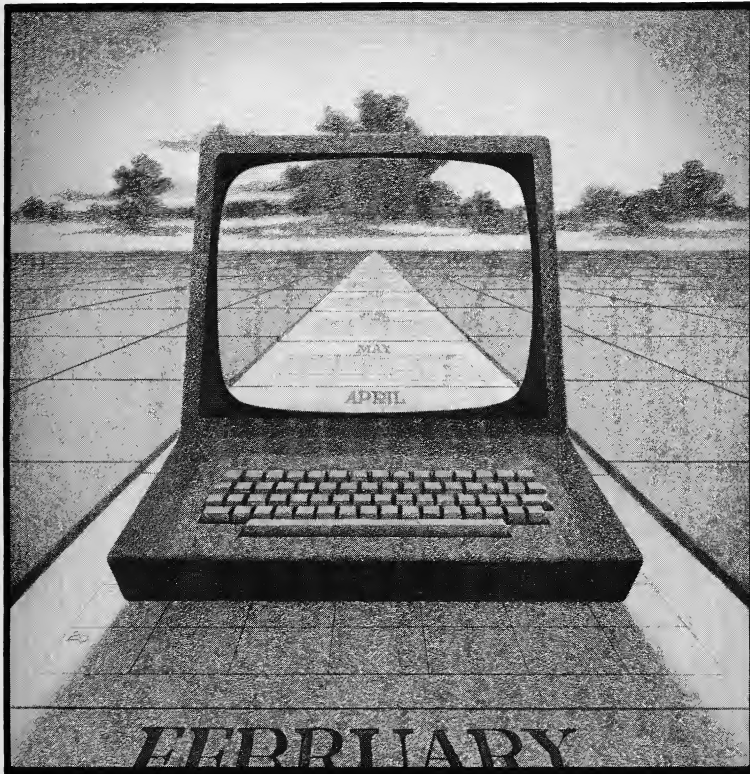
Software Basics

Software is the name given to the series of instructions that tells a computer what to do. You use the software; the software uses the computer. An individual set of instructions is called a **program**—a general ledger program, for example, or an accounts payable program.

There are two kinds of software. The first, **systems software**, shouldn't concern you much. Systems software is usually provided by the manufacturer. You can think of it as the "housekeeper." Its job is to run the machinery (the video screen, the printer, the memory, etc.) so you don't have to worry about it. The second kind of software is more important to you. **Applications software** carries out specific jobs such as payroll. Without applications programs, a computer is useless.

How do you get applications software? Unless you're a computer programmer yourself or are willing to learn, you have three choices. First, there's **custom software**, written to your specifications by a contract programmer. Then there's **packaged software**, often called **canned** or **commercial software**. Packaged software has already been developed and is sitting on the shelf ready to run. Your third choice is to start with a package and have it modified.

Chapter Six will explain the pros and cons of the three ways to get applications software.



Chapter Four

How Much Computer Do You Need?

*Take A Look
At The Past,
Present And Future
To Find Out*

Assuming that you've decided to shop for an in-house computer, your next step is to determine how much "horsepower" you need—how much **software** horsepower (most programs have limits) and how much **hardware** horsepower (how much memory, how fast a printer, and so on). This chapter will help. The worksheet you prepare here will later become part of your "request for proposal" to tell vendors exactly what you want.

How do you determine how much computer you need? Simply by measuring the size of your operation in the areas you will computerize. Using the worksheet at the end of the chapter, you will write down a few basic facts—how many customer accounts you have, how many employees, etc. It is not a big task and it should not be overlooked. When you get done, you will have some numbers to give to vendors. With these numbers, they can determine how much computer you need.

They will study your figures and come back with suggestions like "I advise a 10-megabyte hard disk and a 300-lines-per-minute printer."

You'll notice that the worksheet doesn't ask you to translate your figures into computer terms. As long as you get at least three opinions, you can safely leave those calculations to the vendors (or to a consultant). But it's important that **you** do the preliminary work set forth here, so you can (1) avoid the common pitfall—described below—and (2) be in control when you buy.



CONSUMER ALERT

Pitfall #4:

Is Bigger Better?

Neither the price of a computer nor the size of the box that contains it is a good indication of computing power. You can easily pay more money to get less computing power. For instance, one \$6,000 system that we tested at ACU proved to be faster than many systems costing twice as much.

In fact, the market is so confused that, in a few cases, the price/performance ratio doesn't even hold constant within the same company. You can frequently get more computing power by paying less. This has happened at IBM before, and just happened again with IBM's new Personal Computer.

So what do you do? First of all, we suggest that you refer to independently run tests of computer performance such as those published by the Association of Computer Users. Our tests are conducted by the Business Research Division of the University of Colorado. The same standard programs are run on different systems to show which ones offer the most performance for the price. We have several tests to measure different aspects of a computer's performance. These tests give a fairly complete picture of the processing speed of the most popular computers in selected price ranges.

Don't get us wrong. We're not pretending that speed alone is your most important

consideration when buying a computer. You wouldn't buy a car just because it has the highest top speed. And you shouldn't select a computer just because it was rated fastest in these tests. Even more important than speed are the software, the service and the price.

So don't rely exclusively on benchmark tests—but don't buy a computer without referring to them either. It makes sense to get the most bang for your buck when you buy hardware.

The Moral: In the world of small computers, bigger and more expensive does not necessarily mean better.

A Common Pitfall

First-time buyers typically get *too little* or *too much* computer power. We have, for instance, talked to a business owner who spent *twice* as much as colleagues elsewhere for computer systems that do the same work.

The problem of overbuying is a good reason not to rely solely on the rule of thumb from Chapter 2. That was fine for making an estimate of your approximate costs, but **don't** make the mistake of telling a computer sales representative that you've got a price in mind. If you do—lo and behold—when the bid arrives, it will be just about the maximum figure you established.

If your computer is not too big, then it's likely to be too small. Underbuying is even more common than overbuying, partly because some vendors allow it to happen. Some sales representatives, knowing they are in a competitive bidding situation, will under-configure the system to keep the cost down. Unfortunately,

their customers usually don't discover until after installation that they are short on terminals, printer speed, disk memory, or something else.

When the owners of a four-store Southern California TV and appliance dealership bought their first computer, they didn't measure the size of their operation and, as a result, they bought the wrong size computer. Six months after the purchase, they had already outgrown the system. They had to buy an entirely new computer, redesign all their software, re-enter all their information, and so on.

They made this mistake because they weren't in control when they bought the first time. They let the vendor take charge and tell them how much computer they should get. Surprise—the vendor's "scientific survey" showed that they needed just the size computer the vendor happened to be selling (some coincidence!). As this company found out the hard way, it's not wise to put a decision this important in the hands of an outsider. If the vendor makes a mistake, you're the one who has to live with it.

IDEAS YOU CAN USE

A Minimum Business System

Business with revenues less than \$1 million are likely to end up with a **micro**computer (as opposed to a larger **mini**computer). No matter how small your operation, any computer you buy should meet these minimum standards.

- 64 kilobytes of Random Access Memory (RAM)—so you can run serious business programs
- 2 floppy disk drives—so you can move data back and forth and backup each one

- Capable of running the *de facto* industry standard **CP/M operating system**—even if you start out with another operating system, you may someday want access to the vast library of CP/M programs
- An optional hard disk drive—even if you don't need it yet
- Optional multi-user capability (allowing you to attach more terminals) or networking capability (permitting several small computers to communicate and to share a hard disk)—even if you don't need it yet
- Availability of a letter-quality printer—even if you don't need it yet. Most businesses eventually discover that word processing is an excellent way to get full value from their computers

Although you may read stories about firms that have successfully used hobby computers for business, our advice is *not* to bring a hobby system to the office. With prices dropping so rapidly, you have no reason to make this kind of sacrifice in expandability and flexibility. And under no circumstances should you try to use an audio cassette-based system for business—they are simply too cumbersome and unreliable.

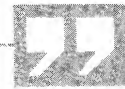
How To Get In Control

The worksheet will help you “measure” your business and put you in control when you buy. In this way . . .

- you'll have more confidence that vendors aren't overlooking anything
- you'll know that vendors' suggestions are based on actual measurements of your business, not on guesses
- you'll reduce the chances of being sold what the vendor has on hand instead of what you really need
- you'll give identical information to each vendor, making comparison shopping easier



The worksheet in this chapter should save you money and time in the long run. Without it, you'll find yourself answering the same questions each time you talk to a different vendor.

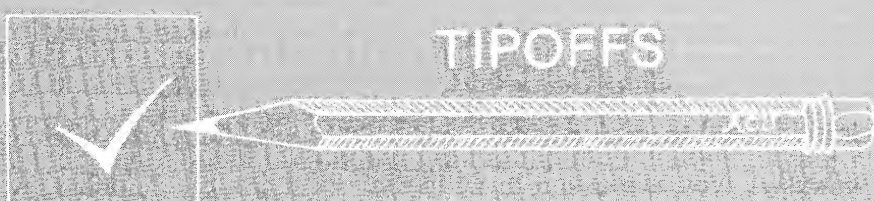


Some companies gain control in another way—after they measure their operations, they make the information part of the contract. Instead of a document that merely reads “Vendor promises to deliver one BX-1000 Razzle-Dazzle Super System,” they can specify such things as “System will process 500 accounts receivable and produce an aged trial balance within 30 minutes.” They specify in the contract how much horsepower the vendor must deliver.

And if you measure your business in the way we suggest below, you will also know in advance what your peak time needs will be. Many computer owners experience delays and overtime during rush periods because they failed to consider their peak demand when they decided how much computer to buy. It's one thing to process 200 accounts per month at 10 per day, and quite another to do 200 per month if 195 of them must be processed on the 30th. If you know your peak time needs, you can shop for a computer that's fast enough for your busiest days.

The worksheet in this chapter should save you money and time in the long run. Without it, you'll find yourself answering the same questions each time you talk to a different vendor: “How many accounts do you have?” “How many items do you have in inventory?” etc., etc. Worse yet, the vendors may **not** ask those same questions and just sell you whatever they've got on hand. If that happens, you'll probably end up with a system that's the wrong size.

So when a sales representative asks you how much you want to spend, say “Just enough to get these jobs done and not a dollar more,” and then hand over worksheets #2 and #3.



TIPOFFS

The Hardware Smoke Screen

The Tipoff: The sales representative: “Is this machine fast! The CPU cycles at 6 MHz! And wait till you hear this—this little baby’s got a Winchester drive with a 20 millisecond track to track access time! And it can communicate at 2400 baud . . .”

The Ripoff: Some vendors will use the technical specifications of their equipment as a smoke screen to hide the flaws of the total system. A computer system is only as good as its weakest link, so software, peripheral equipment and service are as important as the “black box,” if not more so.

It’s like a car with a powerful engine that is theoretically capable of going 100 mph. If the transmission has only low gear, you are never going to get much over 25 mph. These days, no automobile manufacturer would forget to put in a higher gear, but computer makers make correspondingly disastrous mistakes every day.

There is a long list of failed computer companies who produced machines with great specifications and lots of hardware horsepower, but without the other necessary ingredients for a successful system.

The Solution: When vendors put up a hardware smoke screen, tell them you’re not interested in the technical mumbo-jumbo. Your question is how fast and how well it will get your work done when it is sitting in your office.

Let's Fill Out The Worksheets

It's really not hard at all—you should be able to complete the worksheets in less than an hour, and probably in much less time if you ask your accountant to help you.

Worksheet #2 — Measuring Your Needs/Records

This worksheet measures the **records**, the amount of information you'll need to need to store in the computer. Go down the list of applications, filling in the blanks for all that apply to your business (including applications you think you might add someday). You are asked to fill in two numbers, the "Current Amount" and "Three Years From Now."

Under "Current Amount," fill in today's numbers. The second space, "Three Years From Now" is to allow you to plan for expansion. Most businesses outgrow their first computer before the year is out, so give yourself some headroom. You do not need to buy a computer today that's big enough for where you expect to be in three years but you **should** buy a machine that can expand as necessary. Figure in advance for expansion so the system you buy can keep up with you as you grow. Believe it or not, most small computers have very limited expansion capability.

You may have long range business plans from which you can get figures to use for "Three Years From Now." If not, make an estimate, adding **at least** 30 percent for growth.

Worksheet #3 — Measuring Your Needs/Volume

The next worksheet measures your "transaction volume," the amount of work the computer will have to do. It's important in determining how fast the printer should be, how powerful the system must be and so on.

Now fill in the three blanks for each application. The first, "Current Average,"

should be your estimate of the average number of transactions for the specified period. The second number, "Peak Volume," is the amount you handle on your busiest day or month. The third number, "Average Three Years From Now," should be handled just as you did in the previous worksheet by adding on at least 30 percent for growth.

That's all there is to it! We suggest that you run through this exercise even if you've decided to hire a consultant to help you with the buying process, since he or she will be asking you the same questions.

Don't know whether you should get a consultant, or how to use one profitably? The next chapter will give you pointers.

WORKSHEET #2 (a)**MEASURING YOUR NEEDS****Records**

	Current Amount	Three Years From Now
Accounts Receivable How many customer accounts?		
Accounts Payable How many suppliers and creditors?		
Client Write-up How many clients?		
General Ledger How many accounts?		
Inventory How many items in inventory? How many warehouses? How many stores?		
Job Costing How many employees? How many jobs per year?		
Order Entry How many suppliers? How many customers? How many items in inventory?		

(Continued . . .)

WORKSHEET #2 (b)**MEASURING YOUR NEEDS**

	Current Amount	Three Years From Now
Payroll How many employees?		
Point-Of-Sale How many stores? How many registers per store?		
Property Management How many properties? How many tenants?		
Word Processing How many standard documents kept on file? (contracts, form letters, legal forms, etc.)		
Other What records must be kept on hand?		

WORKSHEET #3 (a)**MEASURING YOUR NEEDS****Transaction Volume**

	Current Average	Peak Volume	Average 3 Years From Now
Accounts Receivable How many statements do you send per month? How many payments do you receive per month?			
Accounts Payable How many checks do you write per month? How many shipments do you receive each month?			
Client Write-up How many clients do you process per month?			
General Ledger How many journal entries per month? How many separate cost centers or departments?			
Inventory How many items replenished per month? Number of groups of related categories?			

(Continued . . .)

WORKSHEET #3 (b)**MEASURING YOUR NEEDS**

	Current Average	Peak Volume	Average 3 Years From Now
Job Costing How many jobs active at one time? Number of parts a job can have?			
Order Entry How many orders received per day? How many orders received per month?			
Payroll How many checks written per month?			
Point-Of-Sale How many transactions per day?			
Property Management How many rentals processed per month?			
Word Processing How many pages typed per day? Typical length of document?			
Other How many transactions?			

From Computerese To Computer-ease In Simple Installments

In this chapter we have suggested that you measure your business and leave it to vendors or consultants to translate those measurements into computer terms. But even if you leave the calculations to someone else, you are likely to encounter some of the following terms which are used to measure a computer's ability to store and transmit information.

Alphanumeric. A combination of the words "alphabetic" and "numeric" used to describe characters which may be either letters or numbers.

Baud Rate. Baud stands for "bits per second" and measures the rate at which data can be transmitted.

Bit. The only thing the electrical circuits of a computer understand. A bit is either "on" or "off," generally represented as 0 or 1. Computers use different combinations of bits to represent characters.

Byte. A byte is a string of 8 bits, but more importantly, a byte represents one character. If your computer has a memory of 1,000 bytes, then it can "remember" 1,000 characters.

Character. If vendors ask you how many characters you have in a typical customer record, they want to know how many alphanumeric characters—letters, numbers and spaces—are in that record. Usually, one character is represented in the computer by one byte.

Kilobyte. Often abbreviated with the letter "K." Used to stand for 1,000 bytes (although it actually represents the number 1,024). You'll hear it used to describe the storage capacity of disk drives and the memory capacity of computers. A 64K computer has approximately 64,000 bytes of random access memory (RAM).

Megabyte. Approximately one million bytes.

Memory. Usually refers to the random access memory inside the computer itself, and is measured in kilobytes. The more memory, the larger and more complex programs the computer can run.

Throughput. Just as an engine's "power" is the amount of work it can do, a computer's "throughput" is the amount of work it can accomplish.

Chapter Five

Computer Consultants

How To Find Affordable Help



Because the small computer marketplace is so confusing, many first-time buyers look for consulting help. By providing an objective evaluation of your organization and its computing needs, a good consultant can lead you out of the chaos of computerization. He or she can cut through the ad claims, line up the best system and oversee installation.

But if you don't know enough to pick the right computer, how are you supposed to pick the right computer consultant? Like computers, consultants vary widely in their specialties, abilities and rates. Because inexperienced buyers don't have the necessary know-how, they often run into the following kinds of trouble when they decide to hire a consultant:

- they can't find anyone affordable, or
- they hire an unqualified consultant, or
- they use a consultant the wrong way and don't get their money's worth.

This chapter will help you out of this Catch-22 situation by explaining (1) when to use consultants, (2) where to find them, (3) how to choose them and (4) how to get the most out of them.

How Much Do They Cost?

Before you get too enthusiastic about consultants, however, we should warn you that you may not be able to afford them. Because of the tremendous demand for data processing expertise, fees for “slightly experienced” consultants begin at \$200 per day. If you want more experience and better advice, you’ll pay \$500 to \$1,000 per day.

You’re likely to spend two to five thousand dollars to have someone tell you which computer system to buy and help you install it. You can spend many times that amount if the job involves a complex system or actual programming. The rule of thumb is that companies with sales over \$10 million can expect to pay 10 to 20 percent of the cost of the system for consulting help. Companies with sales less than \$10 million will pay 15 to 25 percent of the cost.

But consulting fees look more reasonable when compared to the cost of management’s time and the cost of making a buying mistake. If you take the steps we’ve outlined below, you’ll increase your chances of finding a consultant who will prove to be a bargain in the long run.

When To Use Consultants

When we use the words **computer consultant**, we mean any professional who offers data processing advice and assistance for a fee. Many of these offer programming as part of their total package. When should you call on such a person for help?

You can, if you want, hire professional help for the entire computerization process. In such a case, the consultant will go through a procedure similar to the one in this book, but he or she will do most of the work.



A consultant can be invaluable during contract negotiations. Although you only negotiate once, you live with the results for years.



To save money, you can hire a consultant to help with a portion of the buying process and do the rest yourself. Here are three situations where consultants often make sense for small computer users with limited budgets:

1. For Special Skills. Although small computer users must learn as much as possible about their systems, certain special skills are outside their range of expertise.

Many small business owners and professionals, for example, are weak in long-range planning. The planning stage, therefore, is one of the best times to get outside help. A good consultant will keep you from loading up a room with equipment before you know what to do with it. He or she will uncover your long-range objectives with a “check-up from the neck up” to find out where you want to go so the computer can help you get there.

A consultant can also be invaluable during contract negotiations. Although you only negotiate once, you live with the results for years. An experienced consultant knows what questions to ask vendors and how to handle the delicate give-and-take of the bargaining process. You have an expert to represent you and protect your interests.

And consultants are often useful during the conversion from existing manual systems to new computers. Big corporations can afford in-house experts on installation, staff training and so on. A small firm or a professional, however, is often wiser to have an experienced outsider handle these one-time tasks.

2. For Peak Time Needs. Although small computer users generally call in consultants for their special skills, there are other occasions when the benefits may outweigh the costs, including peak time personnel needs. Perhaps, for example, you are looking for a full-time programmer and want to find just the right one. A consultant programmer can fill in and buy you time to look around carefully.

3. For An Impartial Viewpoint. This is more common in large corporations where politics and power struggles are the name of the game. But even small firms can sometimes benefit from the fresh perspective of an outsider, someone who won't become enmeshed in long-time personality conflicts.



CONSUMER ALERT

Pitfall #5: Passing The Buck

When a Los Angeles, California, design firm wanted to buy a computer, it assigned the low person on the management totem pole—the office manager—to look into it. He took a class at a local college, shopped carefully and brought in a system. It worked just fine, too. Or, at least, it worked fine for office tasks like word processing and accounts receivable.

But what the president of the company really wanted was to increase the productivity of the expensive designers and architects on his staff. He wanted a

complex data base and he wanted computer-aided design, things that the newly purchased system could not handle. He's now waiting to pay off the \$18,000 on the first computer before he starts shopping for a larger machine that can do what he really wants. This time he's going to get involved in the selection process.

Sure, a computer can save money by automating routine office jobs and saving time. But that's only half the story. Computers can also **make** money, if they are used as a management tool. But if management is going to use it, management **must** be involved in choosing it. You can pass off some of the work to subordinates or to a consultant, but buyers who try to get away with absentee purchasing greatly increase their chances of an unhappy choice. In fact, many consultants cite "passing the buck" as one of the biggest reasons for unhappy and unproductive client/consultant relationships.

Ironically, a few computer buyers make the opposite mistake—they fail to involve anyone else. You should always get feedback from the people who will actually be using the machine. If you suddenly spring automation on unprepared employees, you may encounter resentment and resistance.

But after you've gotten feedback—from employees, from consultants, from other users—it's up to you to say what it is you want.

The Moral: When top management doesn't know what it wants, it gets just what it had in mind . . . nothing.

Where To Find Consultants

As we've seen above, consultants often make sense when you have a one-time need for a special skill, when you have peak-time needs or when you want an impartial viewpoint. Knowing **when** to use consultants won't help, though, unless you know **where** to find them. It's not always easy.

Four groups typically provide assistance to small computer users: (1) general

management consultants, (2) accounting firms, (3) data processing or “technical” consultants, and (4) college professors. Each group has its pros and cons.

General Management Consultants. Often an excellent choice because they talk the language of business owners and professionals. They approach computerization from the correct perspective—as a way to enhance clients’ business objectives. On the negative side, many of them have only recently added the words “computer expert” to their resumes. They may not have sufficient data processing experience. In addition, they are usually **very** expensive.

Accounting Firms. Many public accounting firms have well-established consulting departments. They may be interested in helping a small computer buyer. But accounting firms often sell computers or software themselves, or have clients who do so, making it difficult for them to remain impartial. What’s more, they may be placed in the position of auditing the very system they sold or recommended. One answer is not to engage the same firm that audits your books, or to make it clear from the start that you would consider any recommendation for their own software to be a breach of the consulting agreement.

DP Consultants. In addition to general management consultants and accounting firms, many small computer buyers turn to DP or “technical” consultants, often former programmers who have gone out on their own. Such individuals are generally strong technically, but tend to be weak in the all-important human problems. Ideally, consultants should understand technology **and** business.

College Professors. Computer users on a tight budget may want to look into the services available from nearby colleges and universities. Many professors offer top-notch consulting services at low rates. It’s worth a phone call to find out, as long as you make sure that any academic you hire has had “real world” experience. Also, be sure that your work won’t be delegated to students without your permission.

IDEAS YOU CAN USE

Locating A Computer Consultant

There is one way **not** to locate the right person: by accepting free "consulting" help from vendors or service bureaus. Once more with feeling: **Don't accept "free" help from vendors.** You may be tempted by the chance to save money, but no vendors will recommend a competing brand even if it's really better for your needs; indeed, they may not even be familiar with all the alternatives on the market.

The best way to find an independent computer consultant is through a personal reference. Members of the Association of Computer Users have an edge in this department, since they can get in touch with the local contacts listed on the back of every issue of *Interactive Computing*, ACU's official journal. Often these individuals can steer you toward someone who has the information you need.

Conferences and expositions are another starting point. Computer seminars and exhibitions are held throughout the year in most major cities; many of the speakers are consultants. At these gatherings you can size up several prospects at once, and often meet other users who have valuable advice.

You may also want to contact the head of the computer science department of the nearest university or junior college. He or she may volunteer to take on your project or refer you to other consultants in the area.

Even with conferences and personal references, you may not find a consultant with the right specialty, or you may want to get additional names so you can compare bids from several firms. If so, you can turn to the sources listed below. All of these organizations provide no-charge referrals, sell a consultants directory, or both.

If you get a name from a list, you must be doubly careful about checking references. Banks or credit checking companies can run a preliminary screening; you'll have to do the rest. Good reference checking includes finding out how the consultant worked so you can determine if the approach is the right one for you.

Here are some sources that may be able to give you names of computer consultants in your area.

(Continued . . .)

**The Association of Consulting
Management Engineers (ACME)**
230 Park Avenue
New York, NY 10169
(212) 697-9693

**The Association of Management
Consultants (AMC)**
331 Madison Avenue
New York, NY 10017
(212) 490-3113

The Consultant Brokerage
1104 Blue Lake Square
Mountain View, CA 94040
(415) 961-0409

**Computer Consultant
(a newsletter)**
Battery Lane Publications
P.O. Box 30214
Bethesda, MD 20014

**Directory of Management
Consultants**
Templeton Road
Fitswilliam, NH 03447
(603) 585-2200

**Directory of Professional
Consultants**
Howard L. Shenson, Inc.
20121 Ventura Blvd., Suite 245
Woodland Hills, CA 91364

**Independent Computer
Consultants Association**
P.O. Box 27412
St. Louis, MO 63141
(314) 567-9708

**The Institute of Management
Consultants (IMC)**
19 W. 44th St.
New York, NY 10036
(212) 921-2885

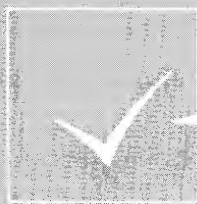
Choosing The Right Consultant

Above all, be sure to shop carefully before you sign a consulting contract. Remember that bigger doesn't necessarily mean better. Small clients often get lost in large, impersonal consulting firms. And big firms have a habit of sending out highly competent senior staff members to land the assignment, then giving the job to a junior-grade trainee who lacks experience. If you're considering hiring a big firm, therefore, find out exactly who will be doing the work.

But small consulting firms aren't the universal solution either. Some of them

don't have the resources to do a top-notch job. They tend to be "hungry" and prone to jump in over their heads, or to take on too many jobs at one time. Our advice: When you bring in a consultant, you're paying for knowledge he or she's supposed to have already. Don't pay the consultant to learn. If you are hiring someone to do something, require proof that he or she has done it before.

Whether the consultant you hire is an accountant, a professor or a professional consultant, it's vital to ensure that he or she has the proper credentials. All it takes to set up business as a "consultant" is \$25 for cards and stationery, so look for a record of success in solving business problems like yours.



TIPOFFS

The Biased Consultant

The Tipoff: Your consultant offers to help you buy your hardware through a "special arrangement" with a friend who is a vendor. Or tells you that there aren't any available packaged programs that will do what you need done—but he or she's willing to do some custom programming for you "as a favor." Or your accounting firm presents you with an "unbiased" recommendation that you buy their firm's newly developed accounting software.

The Ripoff: If your consultant has any kind of financial stake in the outcome, you will **not** get an objective evaluation. Be on the alert, because biased consulting is not unknown even at prestigious CPA firms.

The Solution: Before you sign a consulting agreement, make it clear that, whatever the outcome, you will not purchase **any** hardware or software from the consulting firm.

The Worst Problem Of All

Perhaps the scariest problem facing users is the vendor **masquerading** as a consultant. Such individuals sell advice out the front door and hardware out the back, or accept kickbacks for referring customers to certain vendors. The buyer ends up with the system that makes the “consultant” the most money, not the one that’s best for the job.

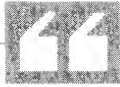
There is a real shortage of consultants, and an even bigger shortage of real independents. Many of them have ties to the manufacturers. Even large accounting firms now sell systems and software, clouding their objectivity.

Obviously, then, before you make a final decision on any consultant, you’ll need to establish his or her credentials and check references. Check with past clients not just to see how they liked the consultants’ service, but to find out what brand was recommended. If most clients have installed the same make, you may be dealing with someone “in the pocket” of a manufacturer.

Getting The Most Out Of A Consultant

Even if you know when to use a consultant, where to find one and how to choose one, you are still faced with getting your money’s worth. Here are several suggestions.

Understand The Purpose. The first suggestion is to use a consultant for the right reasons. Don’t expect the consultant to come in and wave a magic wand. Giant corporations may be able to afford outside help whenever they need it, but small computer users should bring in consultants for overall guidance with an eye toward learning to do it themselves.



When you bring in a consultant,
you're paying for knowledge he or
she's supposed to have already.
Don't pay the consultant to learn.



A good consultant should teach you to do the job **without** as well as **with** him or her. The poorest results occur when management tries to slough off their responsibilities onto the consultant.

A consultant is not "the easy way out." True, consultants can make things easier by filling in the gaps in your computer knowledge, but you still have some heavy responsibilities: choosing the right consultant, using him or her properly, making the final decisions, and learning enough to make your computer pay off after the consultant has left.

Here's our advice: Don't pay someone to do the basic research. Why pay someone \$100 per hour to ask the same questions you'll find in this book? Why pay someone to look through software directories or such documents as ACU's publications?

The **smart strategy** is to do the basic homework yourself, then **hire a consultant to check your results**:

- to verify that you are shopping for the right size computer

- to locate additional software packages
- to verify the competence of the vendors you are considering
- to make sure that your request for proposal is complete
- to confirm that you've selected the best system
- to review your conversion plan
- to test the processing accuracy of your new system

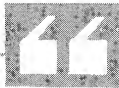
Take A Step-By-Step Approach. Break large projects into smaller ones. Reserve the "go-ahead decision" for the next step, pending results of the earlier one. With this approach you can back out at any time, and you can keep a close eye on costs as they occur.

Negotiate Fees. Estimate costs before they occur. Consulting fees are negotiable, although many consultants won't bargain unless you offer some kind of face-saving concession, such as doing without a final written report, reducing the scope of the project, etc. A flat fee is often best, but most consultants want to charge by the hour or the day. It's a seller's market, so they usually get their way. For a relatively small system, planning should not take more than two or three days, and negotiation with vendors only a day or day and one-half more.

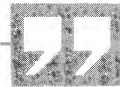
Get A Contract. Naturally, the fee should be set forth in the contract, along with all other important agreements. Don't settle for a handshake. In addition to the cost, the contract should specify who will do the actual work and include a detailed work plan: procedures, timetable, when and how results will be evaluated, etc.

Involve Your Employees. Inform personnel about the purpose and scope of the work. Invite key managers to interview the final candidates to see how compatible they are. Urge employees to work as closely with the consultant as possible, so they learn important skills. And designate a middle manager as the in-house contact to assist the consultant.

Don't Reinvent The Wheel. You'll get more for your money if you refuse to let a consultant reinvent the wheel. Don't let a consultant learn on your time. For example, if he or she is evaluating computer systems, make sure ACU's BENCHMARK LIBRARY is being used. Don't allow a consultant to waste costly time duplicating ACU's exacting tests and specifications.



The smart strategy is to do the basic homework yourself, then hire a consultant to check your results.



Some Final Advice

By all means, shop around for a consultant if you feel you need help in computerizing your business. Don't be discouraged, however, if the consultants' bids are so high that you can't cost-justify their use. You can often get excellent advice and assistance free of charge from other computer users. And by using this guide, you **can** do a good job of buying a computer system on your own. All it takes is a little advance preparation.

In the next section, we will discuss the preparations necessary to find the right software.

From Computerease To Computer-ease In Simple Installments

In dealing with consultants as explained in this chapter, or with contract programmers as mentioned in the next chapter, you may run into unfamiliar words used to describe the process of programming a computer. Here's part one. You will find part two in the next chapter.

The Programming Process—Part One

Applications Programmer. A technician familiar with computer languages who writes the actual programs that perform given tasks such as payroll or inventory control. He or she usually works with, or under the supervision of, a systems analyst.

Batch Processing. Information is saved in "batches" and each batch is put into the computer all at once.

Bug. An error in the software.

Compatibility. Whether or not a program will run on—"be compatible with"—a given computer system.

Crash. A sudden (and usually catastrophic) failure of a computer program or system.

Data Base. A collection of information stored so that each item is recorded only once, but can be used by many different programs.

Data Base Management System (DBMS). A DBMS is a program that manages a data base.

Debugging. Finding and fixing the bugs (errors) in a computer program.

Diagnostics. Self-testing programs that let the computer system check itself for problems.

Enhancement. A change made to a program after its initial release. It may be a fix or a patch to repair a problem, or it may be an improvement to extend the program's capabilities.

6
**Which Is Best:
Canned,
Custom, Or
Combination?**

7
**Evaluating
Software**

8
**Software
Shopping
Lists**

SECTION II:

Finding The Right Software

After you've taken the first steps toward computerization as described in **Section I**, you are ready to turn your attention to software. Software is the most important component of a computer system, yet it's also the hardest to understand. This section will give you nuts-and-bolts techniques that take the mystery out of software selection.

You will start by learning the pros and cons of the different types of software in Chapter 6. There is a way to win the software game, and we'll tell you how in this chapter.

Chapter 7 defines what makes a good program. If you've been frustrated by generalities and vague descriptions when trying to learn about software, this chapter will give you some concrete advice.

Chapter 8 goes one step further, listing specific features to look for in the most popular applications. Don't buy a software package without referring to this chapter's shopping lists. The worksheets at the end of the chapter will become an important part of your request for proposal.



Chapter Six

Which Is Best: Canned, Custom Or Combination?

How To Select Software

The success of a computer system always boils down to one word: **software**. If you can beg, borrow, buy or build good programs, a computer is an invaluable tool. If you can't, it's just useless.

Always shop for software before hardware. Decide what needs to be done, find the software that will do it, then shop for a machine to run the software. The programs you need may only be available on certain computers, narrowing your hardware choices considerably.

The next two chapters will describe how to evaluate software and what to put on your software shopping list. First, though, you should understand the three basic ways to acquire programs. In this chapter, we will spell out the advantages and disadvantages of each method.

Let's start with some basic definitions. We will be talking about **applications**

software, programs that perform specific tasks like accounts receivable, job costing, or word processing. Getting good applications software is difficult—so difficult, in fact, that most experts call it the most crucial part of a computer system. It's not unknown for buyers to plunk down their cash for computer equipment, only to have it sit by partially (or even totally) unused for lack of adequate software.

Unless you know how to write programs yourself, you have three choices when acquiring programs. First, there's **canned** (or **packaged**) software. These programs are already written, sitting on the shelf ready to be put to work. The idea behind packaged software is to spread the cost of development between many buyers by designing for a broad range of users with similar needs. Because of its wide market, its price is low. Canned software often comes as part of a turnkey **system**—a complete hardware/software combination developed for a specific **market**. (There are, for example, turnkey systems for doctors, for contractors, for auto parts store, and many other businesses.)

Then there's **custom** software. These programs are tailor-made by a software house or a contract programmer to solve a unique problem for an individual client. This results—at least it's supposed to result—in software that is exactly what the customer wants and needs. Custom programs differ from canned programs the way custom-built homes differ from tract houses.

Finally, you can use a **combination**: start with a package and have it modified. You might compare this to buying a suit off the rack and having it altered. When this method works—and it doesn't always—the buyer gets the best of both worlds: lower cost, like a package; a better fit, like a custom job.

Which method is best? The debate has been raging for years. In actual fact, all three have proved satisfactory for thousands of users. At the same time, each has fostered its share of horror stories. Over the life of your computer system you may well use all three methods, but if you are new to computers the rule is: Always start with canned software. We will explain why as we take a look at each type of software and its pros and cons.



CONSUMER ALERT

Pitfall #6: Unrealistic Expectations

A Florida remodeling contractor bought a computer expecting to lay off one or two of his office staff as a result. Eighteen months later installation and conversion are finally complete. All his original staff are still with him.

Now that the machine is at last fully debugged and operational, it has been a big boom. He's been able to double his business without hiring any new office employees. But he learned through 18 months of frustration that computers don't perform miracles . . . although you wouldn't know it from the way some salespeople describe their systems.

Many vendors will do nothing to dispel a potential customer's unreasonably high expectations. Here are some of the things a computer **can't** do for you.

A computer won't replace your staff immediately. Don't give your veteran bookkeeper the pink slip the day the new computer arrives. In the beginning, you'll probably need **more** people, or at least some overtime during the conversion process. Later, when the computer is fully integrated into your business, you can expect it to free up a lot of your employees' time, making expansion possible.

A computer won't replace your accountant. You and your accountant will have more information on which to base decisions, but you will still need his or her help in making them. Once the system is installed, however, you may find that you are able to replace a skilled bookkeeper with an unskilled data entry clerk.

A computer can't save a sick business. You'll merely automate your problems. In fact, the time and cost of installing a computer system may make it harder for a floundering business to stay afloat.

A computer can't help you to do things you don't already understand. If you don't know what you are doing, the computer is merely going to help you make the same mistakes faster.

The Moral: Don't expect miracles.



To use canned software, you may have to change schedules, do away with special practices, revise forms, or otherwise bend the way you do business.



Canned Software

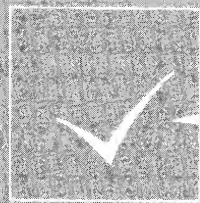
Canned programs offer many advantages. They often cost less than 10 percent of comparable custom programs. And there's no waiting; they are ready to run. You can see them, try them, test them, talk to other users. You know what you are buying. Most packaged software has been field-tested at many customer sites, so canned programs typically run faster, look better and have more options than custom software.

Despite all the advantages, however, you may have problems relying on commercial packages for all your needs. First, you will have trouble finding what you want. Software vendors are scattered all over the country. Most are small operations that do little advertising.

When you find the programs, they are rarely a good fit. Accounts receivable, to name just one example, may mean one thing to you and quite another to the person who wrote the program. To use canned software, you may have to change schedules, do away with special practices, revise forms, do without certain reports or otherwise bend the way you do business. "We market the same way McDonald's markets the Big Mac," admits one software company marketing vice

president. "If you don't want lettuce or special sauce, you have to go somewhere else."

Consequently, to get the right software you must spend a lot of time evaluating different packages. This expense raises the overall price. There are other hidden costs, too, such as software maintenance. Programs need to be updated as the operating environment changes (as you add terminals, for example). Bugs appear long after the system goes into operation. Business, legal and tax conditions change, requiring updates.



TIPOFFS

Do-It-Yourself Programming

The Tipoff: The sales representative: "Oh, don't worry about software! Even if you can't find what you want, you just program it yourself. We can teach you BASIC—you'll be programming like a pro within a week . . ."

The Ripoff: Buying a small computer expecting to program it yourself is like buying a Cadillac body with the idea of building the engine in the garage. If we *had* to, most of us could eventually learn enough about auto mechanics. But while we were learning, our expensive Cadillac couldn't be driven. And do we really want to spend all our free time out in the garage?

Your home-brew programs will never match the speed, versatility, error-checking and good documentation of a professional product. Do-it-yourself programming as a hobby—terrific. As a cost-efficient way to get business software—forget it.

The Solution: Never buy computer hardware until you have located the software to make it useful.



Even legitimate programmers routinely take longer than expected—months or even years longer.



Custom Software

Because of the difficulties of finding just the right package, some users turn to custom programs. Custom programs can be tailored to do things your way. To the best of their ability, programmers are going to write what you tell them you want. It's more expensive, but some business owners believe it's worth the extra cost to ensure that you run the computer and not the other way around.

Good custom programmers know just what is and isn't possible. They are often able to suggest improvements and additions that will get even more out of your machine. In addition, they generally service what they sell; they maintain and enhance the software as needed.

But it's no picnic finding someone to do custom programming. Experienced programmers are in great demand. If you find one, it's tough to determine if he or she is qualified. When a Midwest fuel-oil dealer bought a \$23,000 computer two years ago, he also paid \$20,000 to a software company to write special programs. After laboriously typing all his customer information into the computer, it was later erased from the disk due to a programming error. He was forced to return to manual bookkeeping during the height of his busy season. We wish we could say

that this is the only such horror story we've heard, but it's far too common.

Some software houses just don't have enough experience to do a good job. Others routinely bid low to win business, then take improper shortcuts or back out of agreements. Moreover, even legitimate programmers routinely take longer than expected—months or even years longer.

Another drawback to custom software: you're the guinea pig. Few programs are bug-free, especially custom-written ones. Even if you thoroughly investigate the people you'll be dealing with and carefully define your needs, you're going to be on a treadmill for a while. Wait for the program, test it, discover (sometimes painfully) the problems, wait for the corrections, test the revised program . . . it can be a frustrating nightmare.

And it can be an expensive nightmare. Very few jobs get done for less than \$5,000 these days. Fees ten times that much are not unusual.



CASE HISTORY

WHAT CAN I LEARN?

Neal Koss, M.D.

Some computer users are hobbyists with programming know-how who enjoy creating their own software. This approach has both advantages and disadvantages, as we see in this case history.

Neal Koss, M.D., is a Torrance, California, plastic surgeon in solo practice. He employs one full-time secretary-receptionist, a part-time RN and a part-time bookkeeper. Although he's been involved with computers for over 18 years, it wasn't

until two years ago that he decided to buy a small system to use in his practice.

His choice was an \$8,000 Industrial Micro Systems product—a 64K Z-80 microcomputer with 8 inch floppy drive, Beehive CRT, CP/M operating system and a TI 810 printer. He later purchased a second micro (this one a similar Z-80 system) for his home. Most people don't need two computers, but Dr. Koss wanted a machine at home because one of his hobbies is developing software. In the past, he has spent time developing statistical software and operating systems for medical data analysis in research environments. More recently, he has been experimenting with the programming languages "C" and "FORTH."

Users with data processing experience have certain advantages when it comes to putting a computer to work. For instance, when Koss decided to automate his general ledger and accounts payable, he started with Osborne packaged software, then modified the programs extensively to suit his needs. He reports that the programs are now much larger and feature faster screen manipulations and improved search techniques.

He's also added things that he was unable to find in any package, such as asset file maintenance for tracking assets, applying depreciation, etc. He calls his modified software "genuinely helpful," and has passed it along to two friends, one a dentist and the other a computer store owner. Both have successfully adapted the system to their own businesses.

Although the experiences of Dr. Koss illustrate the advantages of programming know-how, they also demonstrate some of the drawbacks to the do-it-yourself approach. Although Koss has plenty of expertise, he doesn't always have enough time to use it, so his computer is not being used to its fullest extent. Examples are accounts receivable and medical billing; those applications must wait while he completes a program he is developing together with some other medical people.

Meanwhile, the computer doesn't do much else than general ledger accounting and that means that Koss doesn't get full value out of it. He hopes to change that soon by purchasing a second terminal and a letter-quality printer that will let his secretary use the computer for word processing. He is now trying out several different word processing programs to choose the package he will buy for the office.

With his considerable computer know-how, it's not surprising that Dr. Koss has given talks to medical groups about computerization, and was formerly President of the Society for Computer Medicine. Although he calls himself a computer "fanatic" and says he'd like to see more people get involved with computers, he warns that buying a computer can be hazardous to your pocketbook.

How can users avoid such problems? "The number one thing," Koss counsels, "is to find people who already know about computers and learn from them. Don't just go out and listen to dealers—they are not on your side."



Combination software sounds good—but it's a lot easier to say than to do.



Combination Software

What if we started with canned software, then had it modified? That would save time and money over custom programming, yet the end result would be tailored closely to our preferences.

Sounds good . . . but it's a lot easier to say than to do. First, many programmers don't want to get involved modifying packages; it just doesn't pay as well as "from the ground up" jobs. They also don't like to do it because it's hard work. Many mass market programs use machine language that's tough to alter. And to avoid piracy, some software publishers take "security measures" that makes it virtually impossible to change their programs.

Because of these difficulties, modified programs are often more cumbersome to run and more costly to maintain. You could conceivably shell out as much to modify a package as you would to have it custom-written in the first place.

One way out of this bind is to have the software house that wrote the package make the modifications. This can work well, provided the seller is willing, and provided the buyer gets a firm contract that sets the cost in advance and specifies a definite completion date.

So What's Best For Me?

Here's our suggestion on deciding the software debate: **Start with a package** even if you're convinced that you will want custom software later on. You can throw the package away after you've tried it out and still get your money's worth, because you will have learned what you want in a custom program. Since most beginners don't know which features they want, they can spend thousands to get a program that isn't right.

So start with a package if at all possible. Try to make changes in your own operation to accommodate the software. If there are things you just can't live with, try to get those parts of the package modified. If you are still not satisfied, or if you have an unusual application for which there are no canned programs available, only then consider custom programming.

OK—you've decided to start with canned software. How do you choose among the different programs on the market? In the next chapter, we'll discuss some ways to spot quality software.

From Computerese To Computer-ease In Simple Installments

In dealing with consultants or programmers, you may run into unfamiliar words used to describe the process of programming a computer. Here's part two. Part one was in the previous chapter.

The Programming Process—Part Two

Field. One item of information in a larger collection. In a mailing list, for example, the customer's name is one field; street address is another; zip code another; and so on.

File. A complete set of related records. In a mailing list, the file would be the complete collection of all the information; all the names, addresses, etc. for all the people.

Fix. The same as a patch—the correction of a software bug (error).

Flowchart. A "picture" of a system, a program, or a project. Each type of activity is represented by a special symbol. Arrows show how the different parts work together.

GIGO. "Garbage In, Garbage Out." If you put in the wrong data, you'll get the wrong answers.

Input. As a noun, any information entered into the computer; as a verb, the act of entering it.

Interactive. As compared to batch processing, a system that acts on each piece of information as it is entered. Such systems are sometimes referred to as "conversational" or "user friendly" because the computer can respond to each item as it is put in.

Loading. Transferring information into the main memory of a computer. Since most programs for small computers are stored on floppy disks, they must be loaded into the computer's main memory before they can run.

MIS. Management Information System. A system designed, as the name implies, for the benefit of top management. Theoretically, it takes the information generated by the various applications and puts it into reports that management can use to make decisions.

Object Code. Before a program can be executed, it must be translated into machine

language, the series of 0's and 1's that are the only things a computer can understand. After a program has been translated, it is known as the object code.

Overhead. The amount of a computer's memory required to do "housekeeping" chores. The more overhead, the less memory left to handle applications programs.

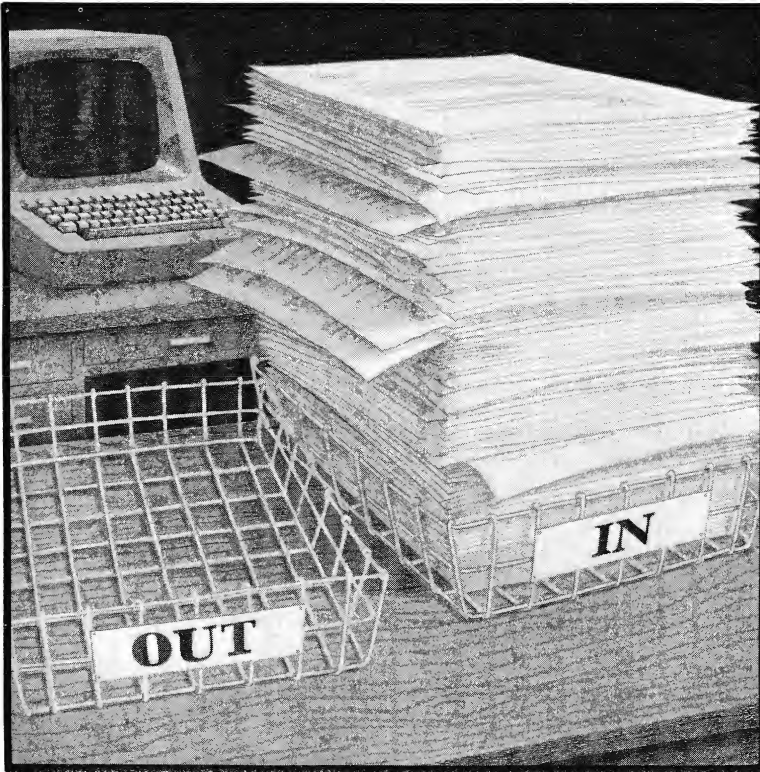
Portable. Used to describe programs that can run on several different computers without modification. A highly desirable trait, but very rare.

Record. A collection of related fields. A mailing list record would contain all the items of information (fields) about one individual. All of the records together would make up the file.

Source Code. Refers to a program before it has been translated into machine language the computer can understand. Also refers to a printed listing of the program. The most desirable software is sold with the source code, so another programmer can make changes.

Standalone. A self-contained program that performs a task without needing support from any other programs. Also used to describe computer equipment, e.g. a standalone word processor.

Systems Analyst. A "liaison" between the user and the applications programmer. The technical go-between who translates the wishes of the user into the definitions of a system and the designs of specific programs.



Chapter Seven

Evaluating Software

*How To Make
The Right Decision
Before Your
Work Piles Up*

In the last chapter, we suggested that first-time computer users should start with canned software to save money and to learn more about computerization before taking the risk of hiring a custom programmer. Now we are ready to talk about methods for finding the best possible canned software.

You should evaluate software on the basis of two factors: (1) Does it meet the general requirements of all good software? (2) Does it meet the specific requirements of my unique business? We'll deal with the first issue in this chapter—we call it “evaluating software from the inside out”—and we'll cover the second topic in the chapter that follows.

Our suggestions are summarized in a worksheet at the end of the chapter. The worksheet is designed to help you avoid a common mistake: judging software from

the **outside** in. Far too many buyers are enticed by the packaging, or believe in the ads, or put faith in brief demos where the sales representative is the one who runs the machinery. Even when they examine something as important as the documentation, inexperienced buyers usually don't go any further than to notice if it's printed on nice paper.

Buying from the outside in is dangerous. Packaged programs carry little, if any, guarantee that they will do what the ads imply. And you can't rely on price or reputation to steer you to the best programs. Some of the best software on the market is reasonably priced; some high-priced packages are disasters.

Likewise, it's not safe to rely on a "brand name." One big-name manufacturer markets a terrific accounts receivable package. Its mailing list software is terrible. Another software house sells a very popular financial planning program. Its data management package, however, is a real loser.

To ensure high-quality software, you must evaluate it "from the inside out." Notice however, that we don't advise testing every piece of software you encounter. **Examine only the best candidates in detail.** The shopping lists you will prepare in the next chapter will help you weed out inadequate programs. We think you should also eliminate a software package unless (1) it is currently being used by many other businesses; (2) you can see a demonstration; and (3) you can talk to current users. New releases and mail order programs might be fine for hobbyist, but a business should consider them only as a last resort and then only with extreme caution.



CONSUMER ALERT

Pitfall #7: Buying Blind

One New York manufacturer bought his first computer on the basis of a half hour conversation with a computer sales representative. Two years later, the \$20,000 machine still isn't fully operational. It's an elegant piece of hardware, but it's not right for the firm. If the sales representative had prepared properly, he would have known that fact before he signed on the dotted line.

Look before you leap into computerization. Carefully define your requirements, and then develop a set of detailed specifications. Without those specifications, you won't know what you are looking for. It's vital to think of a computer as a solution. In order to find the right solution, you **must** define the problem first.

It's not too surprising that buyers often try to do without this step. Preparing detailed specifications is a tedious, time-consuming job. In fact, it's usually the longest part of the entire computerization process. . . and perhaps the most important as well. Without carefully researched specifications you can't write a good contract. In addition, you greatly increase the chance that you will buy too much or too little computer.

The Moral: Detailed specifications are the only way to guarantee that your company will end up with a "firm-fitting" computer system.

From The Inside Out . . .

Evaluating software from the inside out means looking carefully at (1) the documentation, (2) the warranty and (3) the program itself. Here goes!

. . . Documentation

Start your evaluation by examining the documentation. Since a good manual often means the rest of the package is also high quality, the user's manual is one

book you should never judge by its cover. If the manual isn't up to par, you may want to discard that package without going any further.

Good documentation usually has four parts:

- **An Overview** that summarizes the program and explains the available options. Some manuals plunge right in; they leave you more confused than if you hadn't read anything at all.
- **An Instruction Section** that takes you step-by-step through the program with sample screens, sample files, sample outputs, etc.
- **A Technical Section** with the source code and the program logic laid out so the program can be modified and fine-tuned to your needs. Or, if the seller requires an additional payment for the source code, the manual should at least have instructions for linking the programs with others.
- **An Index** for quick reference. It should be thorough, and it should include a list of error codes and some kind of troubleshooting guide.


Don't be satisfied just because the manual has all four parts. Look inside to see if it is written the right way: *for a user*, not for a programmer. It's a bad sign if it's written in computerese, especially if it starts off that way. The first part should be in easy-to-understand English. Later sections can be devoted to the advanced user.

The ideal manual is written for the type of employee who can barely balance a checkbook. Such a person should be able to understand the system without needing an explanation from someone else at every other page.

One quick way to judge quality is to look at the treatment of error messages. Some manuals don't even list them. Some have a list explaining what the symbols mean, but give no clue how to correct the errors. If the documentation doesn't explain how to get back on the track after making mistakes and how to avoid the same error in the future, you're in for certain frustration.

While you are looking over the documentation, you might also check for a newsletter. Many software companies provide free or low-cost newsletters that tell

of updates, bugs, patches, enhancements and so on. A newsletter greatly increases the “lifespan” of a software package.



TIPOFFS

The Special Sale

The Tipoff: Any of these words: special, limited time, bargain, discount, introductory offer, sale, hurry, this can't last.

The Ripoff: We know a Southern California computer store that has been holding a special, limited-time only sale for two years solid. Every serious prospect gets a “personal” letter (generated on a word processor) describing this “soon-to-end” offer. There's nothing wrong with getting a good deal, but don't forget that in the computer game, *prices go down over time*. Waiting could actually get you a better deal.

The Solution: Don't rush things. The computer industry is extremely competitive. There will be as many bargains tomorrow as there are today. Don't make a thousands-of-dollars buying mistake because you were hurrying to save a few hundred at a “sale.”

... Warranties

After putting the documentation under the x-ray, turn your attention to the warranty. Warranties are important because almost all programs contain latent defects that show up long after they were written.



You should *insist* on a bare-bones minimum warranty.



Adequate software warranties are sometimes hard to find, so if you can find a full, money-back guarantee, grab it. If not, you should still insist on a bare-bones minimum warranty. **First**, the dealer should agree to replace defective diskettes or tapes. **Second**, the dealer should guarantee to fix any bugs that crop up within a certain period. **Third**, the dealer should promise to make any updates or revisions available to you at a minimum cost.

Finally, he or she should state in writing that the software will run on your hardware. Be careful here and be specific. It's not good enough to say it will run on "any TRS-DOS like operating system" or "any CP/M system." What about your particular version and your particular language?

Ask about service, too. Who will be available to answer your staff's questions? The ideal situation is to have local software service, but you're unlikely to find that with nationally distributed packages. At the very least, though, the company should provide a toll-free number for users with technical problems or questions that the local dealer cannot answer.



CASE HISTORY

WHAT CAN I LEARN?

Mechanical Maintenance And Service Company

This case history demonstrates the importance of deciding what you want before you buy and getting a good contract to protect you after you buy.

Jaffra Masad is Secretary/Treasurer of Mechanical Maintenance and Service Corporation (MMSC), a small firm that services heating and air conditioning units for commercial establishments in the San Francisco area. After using an outside payroll service for some time, the company decided to purchase an in-house computer. The company was growing and management wanted to get better control. It needed reports that would have been too cumbersome to generate by hand.

Masad and her colleagues went about computerization very intelligently. First, they made some decisions about where they wanted to be a few years down the road. Since they were considering offering computer services to outside clients in the future, they knew they had to find a machine that could expand. They also knew they wanted to buy from a single vendor. "We didn't want to get into a situation of hardware from one company, software from another and each of them pointing fingers at the other," Masad explains.

The local Alpha Micro dealer was able to offer a complete package of accounts receivable, accounts payable, general ledger, payroll and job cost. That's not to say, however, that everything was perfect. Masad describes the job cost program as "pitifully inadequate," but here again Masad and her company thought ahead. Because they got a written commitment for a working job cost system, the dealer is now developing a new package, which is due to be installed soon. Once the job cost program is perfected, it will interface with the other accounting programs.

MMSC also experienced hardware problems. The floppy disk turned out to be faulty; what's more, it turned out to be too small, and Masad quickly grew tired of "constantly pulling disks in and out." A switch to a Control Data hard disk overcame this roadblock. The hard disk has performed perfectly and is much faster than the floppies. It has 5 megabytes of fixed storage and 5 megabytes of removable cartridge.

Alpha Business Computers, which sold the Job Cost Accounting System to MMSC, now sells Winchester hard disk drives instead of the cartridge types. A system

equivalent to the one purchased by MMSC—one terminal, one letter quality printer, one hard disk drive, two floppy disks and software—goes for about \$22,500.

MMSC's current efforts center around bringing the computer up to full speed. The job cost program will be a big addition and the company also wants to make full use of the Alpha's word processing capabilities. Further down the road, says Masad, she hopes to hook up the computer to clients' heating and air conditioning equipment. Such an energy monitoring service would help customers lower their energy costs.

As a first-time computer buyer who did most things right, Masad can offer a few words of advice. "Whatever you do, get it in writing!" was the first thing she volunteered. She also suggested that buyers study their own operation carefully **before** talking to vendors. "If you don't know what you are trying to do, you won't be able to explain it to the vendors. They will come in and make all kinds of promises, but they won't understand what you need—even if they say they do."

Ms. Masad also believes that computer users should try to cut software costs by starting out with packaged programs. "Before you spend any money on custom software, at least try out a package to see if your business can fit. Often, small things in a package can be fixed or changed, if you have a good vendor. If packages prove to be impossible, then you can go for custom programming."

... Programs

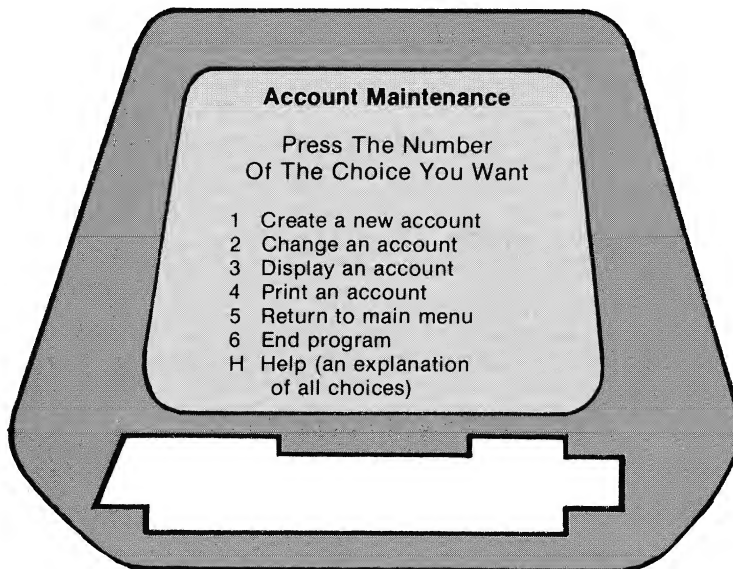
The program itself is the last stage of our three-part testing process. If you examine the documentation and the warranty from the inside out, and you like what you see, then you should go on to actually try out the program.

Many buyers make a mistake when they test drive a program: they only run it the right way. Once you've tried it right, you should always try it **wrong**. Hit the wrong keys; try to make it crash. How does it respond? Look for software that is forgiving, liveable and "humanistic."

On the worksheet at the end of the chapter, you will find a list of important

program features. Here's an explanation of each of these important characteristics:

- **Menu Driven.** A menu is a list displaying all your options, so you merely have to push the number or code letter of the choice you want. At the start of the program, a “main menu” or “master menu” should lay out the basic options. Choice of an option should take you to another menu for that section of the program. Here's a simplified example of a menu as it might appear for one option of an accounts receivable program:



With self-explanatory menus, you can quickly find your way around a program. Not every piece of software is complex enough to justify a menu, but, in general, you shouldn't settle for software without this feature.

- **English-Language Operator Prompts.** Look for a program that talks to you in English, not in obscure jargon or code numbers. (“Prompts” are messages from the computer telling the operator what to do next.)

While you're checking the prompts, make sure the menus and the error messages are in plain English, too. After all, you want software that can be used

by anyone, not just by specially-trained operators.

- **Error-Trapped Entry.** User mistakes cause most system crashes. Error-trapped entry makes it impossible for the operator to enter an obvious mistake—the computer “traps” it and won’t accept it. For example, a general ledger program shouldn’t allow you to post an entry if debits and credits do not balance. It should do the addition and reject any mistakes. Likewise, a mailing list program should trap any zip code entries that have only four digits, or that include letters by accident.

One computer user told us about learning this lesson the hard way. He bought an integrated accounting system that worked fine until a clerk accidentally entered the wrong month when posting some transactions (he hit “7” for July when he wanted to hit “6” for June). The company had to hire an outside programmer to come in for an entire week to straighten out the ensuing mess. **Moral:** Make sure the software has safeguards against human error.

- **Flexible.** Do you have lots of options, or is there only one way of doing things? For instance, can you choose the format for printouts? You’ll get more out of a program if it gives you many alternatives. On the other hand, you don’t want to specify every available option each time you run the program, so look for **automatic defaults**. This means that if you don’t specify anything, the computer will automatically assume that you want the “default value.” For instance, a word processing program might be set to automatically single-space letters unless you tell it to do otherwise.

- **Integrated.** Also called “cooperative,” “interfaced,” or “interconnected.” A single entry should automatically update all the affected files. For example, when an order comes in, a single entry could (1) reduce the inventory file, (2) post to accounts receivable, (3) post to general ledger, (4) tell accounts payable that the merchandise has been delivered, (5) be recorded in the sales commission file, and so on.

An integrated accounting system is a tremendous time-saver, since you input data only once. What’s more, all the programs get the same information, so you

reduce the chance that your books won't balance because, for instance, the bookkeeper accidentally entered \$54.30 into one account after putting \$543.00 into all the others.

- **Rapid Sorting.** Many programs sort information. A bad sort routine can make an otherwise usable program worthless. Some programs take hours (yes, hours) to sort what others do in minutes. Usually the advertising will tell you if the program incorporates high-speed, machine language sorts. See a demonstration to make sure.
- **On-Line Inquiry.** Every program should allow you to display or inspect any file or record contained in storage.
- **A Report Generator.** With this feature, users can create new reports without hiring a programmer to make the changes. The operator simply specifies headings, descriptions, totals and subtotals, etc. to define the new report. A report generator will increase the usefulness of any program, and extend its lifespan as well, since it gives users the ability to modify the output to meet changing conditions and needs.

Without a report generator, you're stuck with whatever reports the system already gives. In such a case, you should get samples of all the reports it puts out and show them to the people who will receive them. Are they satisfied? Will they use them?

- **Input Screen Formatter.** Available with some of the best packaged software, this feature allows you to set up a convenient input sequence for your operators.
- **An Audit Trail.** Transactions should be easy to trace through the system when searching for human or machine errors. All postings to the general ledger, for example, should be identified with a code telling the subsidiary account from which it came, the date of the transaction, and the operator who entered it. (The operator identifies himself or herself to the computer as soon as it is turned on.)
- **Can Be Modified.** The package should either come with the source code (which protects you in case the vendor goes out of business) or, better yet, the vendor should be willing to modify the package as needed (make sure the firm is

financially stable and has a track record of successful modifications).

When a sales representative tells you he or she's got just the software you've been looking for, don't start writing out the check. Keep the following worksheet handy and use it while watching demos, hearing sales pitches or reading brochures.

Our "inside out" evaluation technique works even better when combined with software shopping lists that set out the specific features you need. Turn to the next chapter to learn all about shopping lists.

IDEAS YOU CAN USE

Locating Quality Software

Now that you know how to spot quality software, you may be wondering where you find it. You certainly won't turn up much by looking at the Yellow Pages. Indeed, there is no single clearinghouse of information.

Here are some places to start your search. You may want to refer to the list below even after you've purchased your initial system, since you'll constantly be on the lookout for new software to improve or extend your system.

Computer Manufacturers. Vendors usually maintain a list of packages for their systems. This is a good place to start.

Other Users. Although your direct competitors may not share with you, you should be able to find companies in similar fields willing to tell you about their DP experiences. There are also many small, local user groups made up of people like you who've banded together to share their experiences. Visit a few meetings. Usually the experienced members will take newcomers under their wings.

Industry Trade Associations. Check with the groups for your industry. Some national trade organizations even have specialists who concentrate on data processing.

Computer Related Associations. The Association of Computer Users helps

members find the products they need through a software locator service called SOFSEARCH. Members can call ACU headquarters to place a SOFSEARCH request. A report based upon a data base of 15,000 software packages is then prepared, addressing the specific applications, computers, and industries requested.

You might also check with organizations like the Association of Computer Programmers and Analysts, The Data Processing Management Association, and the Association for Computing Machinery. Your library has the Gale Directory of Associations which lists the national offices for such groups. The national office will help you locate a local chapter.

Trade Publications. Read your industry trade publications with an eye for case histories of successful small computer installations. Call the editor or the company involved to get the name of the programmer or software house responsible.

Computer Publications. Look through some of the data processing magazines. Both the editorial and advertising portions are a rich source of names. Two of the best known publications are *Computerworld* and *Infoworld*.

Conferences And Expositions. Most industry trade shows have at least one seminar or speech on small computers. Attend and get names. There are also a wide variety of DP expositions each year. Many of the speakers at these affairs are consultants and programmers. What's more, the exhibition area itself is packed with hundreds of booths where you can find software and/or programmers. Most computer publications include calendars of upcoming events. Look for the ones in your area.

Your Accountant. Many public accountants can furnish guidance in finding and selecting good software. Be careful, though—some firms sell their own software, and that clouds their objectivity.

Directories. There are a number of directories on the market published by hardware vendors, trade associations, research groups and other organizations. Some list packages, others list consultants and programmers. Your public library probably won't have copies. Be forewarned: most directories cost between \$100 and \$500, and they contain only a fraction of the software that is on the market. Here are several well-known directories:

MICROCOMPUTER SOFTWARE

Datapro Research Corporation
1805 Underwood Boulevard
Delran, NJ 08075

DATA SOURCES

Ziff-Davis Publishing Co.
P.O. Box 5845
Cherry Hill, NJ 08034

ICP DIRECTORIES

International Computer Programs, Inc.
P.O. Box 40946
Indianapolis, IN 46240

INTERNATIONAL DIRECTORY OF SOFTWARE

CUYB Publications, Inc.
First Federal Building, Suite 401
Pottstown, PA 19464

WORKSHEET #4 (a)**EVALUATING SOFTWARE**

Photocopy this worksheet as required. For each package under consideration, check off the features that apply, and don't forget to talk to other users to get their opinions.

	Package #1	Package #2	Package #3
Title of Software:			
Documentation Overview Instruction section Technical section Index Troubleshooting guide Written in plain English Newsletter			
Warranty Money-back guarantee Replace defective diskettes Fix bugs during warranty period Updates available at low cost Guaranteed to run on your hardware Local service Toll-free number for questions			

(Continued . . .)

WORKSHEET #4 (b)**EVALUATING SOFTWARE**

	Package #1	Package #2	Package #3
Program Menu-driven English-language prompts Error-trapped entry Flexible Automatic defaults Rapid sorting On-line inquiry Report generator Input screen formatter Audit trail Can be modified			
Cost	\$	\$	\$

From Computerese to Computer-ease In Simple Installments

Software Definitions

Backup. Making a copy of programs and data as a safeguard against damage or loss of the originals. An absolute necessity with all computer systems.

BASIC. The most popular high level language for microcomputers. Applications software is often written in BASIC. It uses English words and is flexible enough for a wide range of uses, from mathematics to business to games.

COBOL. COmmon Business Oriented Language. A language with instructions very similar to ordinary English. Widely used for programming business applications.

CP/M. The most popular operating system for small computers.

Crash. The result of a system which has become inoperative due to a software malfunction or hardware failure.

DOS. Disk Operating System. Any operating system intended for use with floppy disk or hard disk-based computers.

Dialects. Different versions of the same language. BASIC, for example, has dozens of different versions. A program written in one dialect will not always run on a machine with a different dialect of the same language.

Error Codes (error messages). Messages on the screen that alert the user to an operator mistake or a system failure.

Firmware. Most programs are stored on floppy disks and loaded into the computer when needed. Firmware, on the other hand, is software that has been permanently wired into the computer.

FORTRAN. FORtran TRANslation. A high level language used mainly for engineering, scientific and mathematical applications.

High Level Language. High level programming languages (like FORTRAN, BASIC and COBOL) generally use English words to communicate with the computer. Since a single word may take the place of many individual commands in a low level language, they are easier to work with than low level languages.



Chapter Eight

Software Shopping Lists

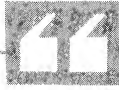
How To Find Money-making Packaged Software

In the last chapter, we suggested you evaluate software on the basis of two factors: (1) Does it meet the general requirements of all good software? (2) Does it meet the specific requirements of your unique business? In this chapter, we will concentrate on number two by showing you how to make software shopping lists.

The lists you make in this chapter will be used again in Chapter 10 for your request for proposal. You can also use this same technique when shopping for additional software after buying your system.

To help you make your shopping lists, we polled users and searched current industry literature to discover the most wanted features for six important applications: Accounts Receivable, Accounts Payable, General Ledger, Inventory, Payroll, and Word Processing. You will find worksheets for these applications at

the end of the chapter. Even if your needs include applications that are not among these six, it is wise to study these examples.



You don't get your money's worth unless you use the computer's power to do things that weren't possible before.



Diamonds In The Fluff

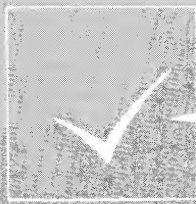
How do shopping lists work and why are they important? Basically, they help you sort through the advertising puffery to find the real jewels. Many software packages with heavyweight advertising claims prove to be lightweight performers in an actual business environment.

Shopping lists are road maps to help you get where you want to go. When small computer buyers don't use such road maps, they often run into expensive detours on the way to acquiring the best possible software. Your lists will be invaluable when choosing between different programs. Because you will have a list of the features most important for your operation, you will be able to spot which software offers the most for the money.

You may be tempted to look for a computerized version of your manual system, a speeded-up rendition of what you already have. ***That's not good enough.*** Your

computer system should give you everything you already have, but it shouldn't stop there. You don't get your money's worth unless you use the computer's power to do things that weren't possible before. If you don't know enough about computers to know what's possible, this chapter's worksheets will give you guidance.

On the other hand, it makes no sense to pay for fancy features you can't use. Many small computer users choose overly-complex systems. In addition to the extra expense, such software is often harder to use and more prone to bugs.



TIPOFFS

Coming Soon To Your Local Vendor

The Tipoff: The sales representative: "Don't worry—we are coming out with that very soon."

The Ripoff: To computer vendors, "soon" can mean tomorrow, two years from tomorrow, or never. In the past, even prestigious companies like IBM have shamelessly preannounced their products, making customers wait 6 to 18 months for delivery. Some companies announce products, but run into financial or technical difficulties and can't keep their promises.

There's another danger—when new products are finally released, they may not be totally compatible with previous products. Consider hard disks. Some popular microcomputers use operating systems that cannot work with a hard disk. Even if these vendors keep their promises to come out with a hard disk "soon," you may not be able to use your programs on it without expensive conversion. Far better to shop for a system that you can test.

The Solution: When the sales representative starts with the "coming soon" ploy, explain that you don't care what the company plans to do, wants to do, or hopes to do, only with what it **has** done.

Four Important Warnings

Before we go on to the shopping lists themselves, here are a few warnings about their use.

Warning #1. Although we have tried to make the worksheets as complete as possible, they still must be customized for your situation. They will give you an understanding of what a computer **can** do for a business, but only you can decide what a computer **should** do for **your** business.

Warning #2. The worksheets list important features, but it's not enough to find out if a package has those features. You need more detail. Do they fit the way you do business? Let's take payroll as an example. It's not enough to determine if the program can handle terminated employees. How does it handle them? Can you issue their W-2 forms immediately or must you wait until the end of the year? Which way do you prefer? What about vacation time—does the payroll program handle eligibility, pay computation, tax treatment and vacation accrual the way you want it to? If not, can you live with the changes you'll have to make?

Warning #3. We are not suggesting that you burden yourself with an overlong document or that you go shopping with unrealistic expectations. **You are not going to get everything you want.** Don't put inflated values on specialized needs. Unless you can afford custom programming, you **will** have to change some of the ways you do business to accommodate the software. If you tried to get all the features shown below onto one system, you'd probably pay a fortune—not only in programming fees, but also to buy a larger computer with the extra processing power to handle all the additional chores.

On the other hand, buying software should not mean overhauling your business. The closer a package matches the way you do business, the better. Still, no packaged program will be perfect, so we advise you to focus on key requirements. Try to get your most pressing needs satisfied. If the program meets 80 percent of your other needs, you've probably found a good compromise.

Warning #4. After you've narrowed down the field, you should take the top candidates for a test drive. Look for the general features common to all good software (as described in the previous chapter).

It's not a bad idea to get the history of the software. Where else is it in use? Don't be the first on your block to use an untested program. And, as always, don't buy until you have talked to other current users.



CONSUMER ALERT

Pitfall #8: Ignoring Murphy's Law

Don't try to defy Murphy's Law. That's the principle, you'll remember, that asserts "Anything that can go wrong, will." Time after time, buyers bank on everything going right. It's fine to **hope** for the best, as long as you **prepare** for the worst.

Perhaps the most common mistake is to ignore the possibility of unexpected delays. If experienced users could give only one warning to first-time buyers it would probably be: plan for frequent delays—in the hardware, in the software, in installation, in training, in repair service. Take the sales representative's most conservative estimate and double that time. Selecting and installing a computer system takes an extraordinary amount of expensive top management time. Plan for it.

The Moral: Don't ignore Murphy's Law. What looks like the light at the end of the tunnel may be an oncoming train.



No program is perfect, so it's wise to decide in advance where you can afford to make compromises.



Firm Up Your Software

Here's how to construct a software shopping list. For each application, start with a blank piece of paper. Label it appropriately—"Accounts Receivable" or "Inventory Control" or whatever. Begin your list by writing down every report you currently receive from your manual system. You should expect your computer system to at least give you everything you already get now.

Next, turn to the worksheets at the end of this chapter. Consider each feature mentioned, and write down the ones you believe will be important to your business.

These first two steps will give you the rough draft of a shopping list. Your next step is to refine this rough draft by talking to other people: your accountant, consultants, trade association officials, other users, ACU local contacts, and so on. You may want to attend a few demos to learn about various features and how they work. As you do some additional research, you may discover some important features not listed on the worksheets. Be sure to add these to your shopping list.

Your final step is to divide the list into two parts. The first section will contain those features you believe are crucial to your operation. The second part will

enumerate those you'd like to have if they are not too expensive. No program is perfect, so it's wise to decide in advance where you can afford to make compromises.

You should also apply the same principles to applications not shown here. **We recommend a shopping list for every program you buy**, whether it's listed on the worksheets or not. For applications not shown here, simply follow the same procedures explained above. Because you won't have the benefit of the worksheets, however, you should spend extra time reviewing sales literature and talking to other users to make sure your lists are complete.

WORKSHEET #5 (a)

ACCOUNTS RECEIVABLE

An accounts receivable program's most important jobs are to prepare fast and accurate statements and to alert you when accounts are overdue. Because a computer can report and analyze the "age" of individual accounts with such speed, you can expect to shorten your collection period—and thereby improve cash flow. Your need for borrowing money and paying high interest will be reduced and your working capital freed up for other purposes.

An accounts receivable program should be flexible. It should, for example, allow you to apply discounts and freight charges to orders. It should allow you to write off bad debts. And it should let you prepare a variety of reports in addition to the aged trial balance—things like commission reports, complete customer ledgers and so on.

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:	Important	Not Important
Allows you to choose between "open item" and "balance forward" accounting.		
Automatically does all the math for you: calculates finance charges, late charges, discounts, minimum discounts, minimum payment due, etc. (It's silly to have to sit in front of a powerful computer and use a calculator.)		
Easy to locate any account (even if you forget the account number).		
Accepts partial payments, returns, allowances and payments that can't be matched to an invoice; can write off bad debts, finance charges or small amounts.		

(Continued . . .)

WORKSHEET #5 (b)**ACCOUNTS RECEIVABLE**

	Important	Not Important
Keeps track of credit limits and notifies operator if exceeded.		
Can include a message on the customer statement, preferably from a menu of standard messages.		
Dual period processing (can work on one month before you've closed the last one, can return to work on previous year's accounts without losing this year's).		

Desirable Reports:**Important Not Important**

Automatically remembers to create all necessary documents: statements, bank deposit slips, delinquent notices, etc. After you have entered payments, for instance, the computer asks "Do you want to print a bank deposit slip?" and then prints it for you if you answer "Yes." (This feature is usually found only on more expensive systems.)		
Delinquent notices for any individual account or for any class of accounts (e.g. all accounts over 90 days).		
Customer lists in a variety of formats: in alphabetical order, by amount owed, by age of amount owed.		

(Continued . . .)

WORKSHEET #5 (c)**ACCOUNTS RECEIVABLE****Important Not Important**

A customer history for any account.		
A payment register (cash receipts journal).		
A sales commission register.		
A listing of pricing errors.		
An aged trial balance (at any time in the month).		

WORKSHEET #6 (a)**ACCOUNTS PAYABLE**

An accounts payable program protects your credit rating by making sure you don't overlook any payments. Moreover, it will improve your cash flow by allowing you to time your payments to keep your money in your own account as long as possible while still not missing any discounts or incurring any late charges. On top of that, it can forecast your cash needs, so you don't find yourself suddenly short on cash.

Here are some things you may want to put on your shopping list:

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:**Important****Not Important**

Allows you to choose between accrued or cash accounting.		
Operator can choose to pay any individual account, any portion of any account, or any class of accounts (e.g., all items due before a certain date, all items subject to loss of discount, etc.)		
Operator can distribute supplier invoices among different expense accounts.		
Accepts adjustments such as partial payments, checks written by hand and entered later, voided checks, and negative supplier balances (because of chargebacks or returns).		
Easy to locate any account.		
Keeps track of supplier discounts and late charges and notifies management of the best time to pay.		

(Continued . . .)

WORKSHEET #6 (b)**ACCOUNTS PAYABLE**

Dual period processing.

Desirable Reports:**Important****Not Important**

Automatically remembers to create all necessary documents: checks, check register, mailing labels, etc.

Automatic check writing with provisions for manually overriding the amounts.

A cash flow forecast (to predict cash needs).

A supplier history for any individual supplier, or any class of suppliers (e.g., for everyone who sells us widgets, or for everyone who sells us more than \$10,000 per year).

Debit memo/credit memo reports.

A list of all open items, by supplier.

A check register.

An aged trial balance.

WORKSHEET #7 (a)**GENERAL LEDGER**

Don't forget to ask your accountant's advice before buying general ledger software. After centuries of accounting practice, there is still no such thing as a standard chart of accounts, so to use a packaged program you will probably have to make some changes in the way you keep your records, or else pay to have changes made in the program. Your accountant can help you decide which package is best for the way you do business.

And you'll also want to work with your accountant after purchase. The computer is just a glorified bookkeeping machine—it can't make decisions about, for example, amortization of leasehold improvements, or depreciation of capital equipment; nor can it tell you how, for instance, to set up the best retirement plan. But the computer can give more time and more information for making such decisions by rapidly taking care of the routine bookkeeping chores.

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:**Important****Not Important**

Operator can format the balance sheet, income statements and other reports any way he or she wants (so you are not tied down to doing things one way).		
Easy-to-trace audit trail (e.g., a source code indicating where the transaction came from—A/R, A/P, and so on—the date it was posted and who entered it).		
Accepts year-to-date adjustments.		
Can post directly to the ledger without going through subsidiary accounts (for certain appropriate accounts).		
Helps operator track down mistakes if the amounts entered don't balance.		

(Continued . . .)

WORKSHEET #7 (b)**GENERAL LEDGER**

Allows accounting by department, cost-center or geographic location.		
Dual period processing.		

Desirable Reports:**Important****Not Important**

Chart of accounts.		
Transaction register.		
Trial balance.		
Balance sheet.		
Income statement.		
Budgets.		
Payroll summaries for any period.		
Actual-to-budget and actual-to-historical statements for comparison.		

(Continued . . .)

WORKSHEET #7 (c)**GENERAL LEDGER**

	Important	Not Important
Reports by department, cost-center or selected account(s).		
Year-end closing report.		
Cash flow statement.		
Interfaces with job costing (if applicable to your business).		
Several levels of password protection (so unauthorized personnel can't get access to sensitive salary information or issue themselves checks).		

WORKSHEET #8 (a)**INVENTORY CONTROL**

Many retailers and distributors have the bulk of their capital tied up in inventory. Computerized inventory control offers such firms tremendous potential for increased profits. Retailing, for example, is a balancing act between keeping too much merchandise on hand and keeping too little. An automated inventory control system makes it easier to walk that tightrope.

Automated inventory control saves time, but perhaps the greatest benefit comes from the reports that summarize and analyze actual sales. With these reports you can spot what's selling and what's not. You can use this information to make better purchase decisions. You can eliminate slow movers and concentrate your inventory dollars where they will make you the most money.

Automated inventory control offers other benefits, too. It can cut invoicing time and reduce labor costs because it automatically generates sales slips, invoices, labels, reports and other important documents. And it can help avoid errors by automatically posting to accounts receivable, by reminding you when it is time to reorder and by calculating the most economical order quantities.

We've lumped together the various kinds of inventory control systems. Cross off any features that don't apply to your situation.

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:**Important****Not Important**

Easy to add, change or delete items from inventory.		
Allows a stock numbering scheme that fits with the way you like to do business (uses coded numbers or uses manufacturer numbers or whatever you prefer).		
Checks stock levels and notifies operator, gives low stock alarm, automatically reorders according to preset minimum and maximum stock levels, but allows operator to easily modify the order, calculates economic order quantity.		

(Continued . . .)

WORKSHEET #8 (b)**INVENTORY CONTROL**

	Important	Not Important
<p>Easy and instantaneous inquiry to any inventory item. Keeps (at a minimum) this information on hand:</p> <ul style="list-style-type: none"> Name Description (style, color, etc.) Inventory number Cost Selling price Discounts Quantity on hand Quantity on order Reorder point Reorder quantities (minimum and maximum) Sales commission date Sold year-to-date plus other information important to your operation 		
Automatically numbers orders in sequence.		
Automatically checks credit (alerts operator if order exceeds limit).		
Automatically makes all calculations: price, tax, shipping charges, sales commission, discounts, etc.		
Allows discounts and manual override of the listed price, if desired.		
Allows credit memos and returns.		

(Continued . . .)

WORKSHEET #8 (c)**INVENTORY CONTROL**

	Important	Not Important
Can include a message on the customer's invoice, preferably from a menu of standard messages.		
Supports multiple locations.		
Supports LIFO as well as FIFO or weighted average costing.		
Automatic updating of accounts receivable and inventory files.		
Password protection to eliminate unauthorized access to computer files.		

Desirable Reports:

	Important	Not Important
Automatically creates all necessary documents: receiving report, sales slip, invoice, packing list, bill of lading, back orders, purchase orders, etc.		
Inventory list (in numerical order, in alphabetical order, by supplier, by location) that includes name, description, inventory number and other information listed previously.		

(Continued . . .)

WORKSHEET #8 (d)**INVENTORY CONTROL**

	Important	Not Important
Price list.		
Inventory evaluation report.		
Net gross profit report.		
Turnover report by item or class.		
Exception reports: low stock alarm, out-of-stock, back orders.		
Sales reports: today's cash sales, today's total sales, monthly sales, year-to-date sales.		
Sales analysis by location, sales representative department, item, customer, or profit, actual to budget comparisons.		
Sales tax records.		
Complete audit trails.		

WORKSHEET #9 (a)**PAYROLL**

Payroll is a complex application. Unless you are very careful to get a well-constructed package, you may be better off to leave the hassles to a service bureau or to a commercial bank.

If you can find a good program, on the other hand, you'll get several benefits. You should be able to save considerable time over a manual system, and save at least the waiting time normally associated with a service bureau. You'll have a much easier time complying with government regulations, since they are all "built-in." And if job costing is more important to your particular business, you'll be able to get a variety of useful productivity and cost data.

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:**Important****Not Important**

Allows easy inquiry to all pertinent personnel and salary information.		
Automatically makes all calculations.		
Automatically handles all taxes (FICA, Federal withholding, state tax, local tax).		
Automatically handles all insurance (workman's compensation, health and disability, etc.)		
"Remembers" how much each employee should get. Operator only has to make entries for changes (vacation, raises, sick time).		

(Continued . . .)

WORKSHEET #9 (b)**PAYROLL****Important Not Important**

Allows choice of pay periods and compensation methods (salary, regular time, overtime, shift differential, etc.).

Allows tips, commissions and bonuses (if applicable to your business).

Automatically prints all necessary documents: checks, government forms, journals, reports, etc.

Accepts handwritten checks.

Interfaces with job costing (if applicable to your business).

Interfaces with general ledger.

Provisions for vacation, sick time, leave of absence, termination.

Several levels of password protection (so unauthorized personnel can't get access to sensitive salary information or issue themselves checks).

Annual vendor updates (to incorporate changes in tax laws and government regulations).

WORKSHEET #10 (a)**WORD PROCESSING**

Word processing is a better way to type. Sentences appear on the screen before they are committed to paper. You can fix mistakes and revise the entire document before printing. You can even move entire sentences and paragraphs from one page to another. And there is no bell at the end of every line. There's no need to hit a carriage return, because the computer automatically puts any word that doesn't fit down onto the next line.

Most word processors are connected to a printer many times faster than any typist—500 words per minute is not unusual. You can file a document electronically so it can be called back for future use. Key paragraphs can be stored for quick insertion into standard documents. Form letters can be called up and individual names and addresses inserted to produce finished documents in a fraction of the time it would take a typewriter.

Instructions: Before shopping for software packages, check off which features are important for **your** applications.

Desirable Features:**Important****Not Important**

Automatic word-wraparound (when the typist reaches the right margin, the next word automatically appears on the line below. The typist does not need to hit the carriage return.)		
Full-width display (so you can see sentences as they will appear on the page).		
Insertion of corrections or new text anywhere in the document.		
Block moves (ability to move sentences and paragraphs to a new position anywhere in the document).		

(Continued . . .)

WORKSHEET #10 (b)**WORD PROCESSING**

	Important	Not Important
Machine-assisted hyphenation.		
Text merge (names, addresses and other information can be inserted automatically into a form letter from a mailing list, from customer files or from accounting programs).		
Global search and replace (find a misspelled word everywhere in the document and replace it with the correct spelling).		
Spelling dictionary (verifies the spelling of all words, notifies the operator of mistakes).		
Automatic headers, footers and page numbers (the computer remembers which page number should come next and inserts it).		
Automatic centering.		
Automatic creation of an index and a table of contents.		
Letter quality printer.		
Proportional spacing (looks almost like typeset copy).		

(Continued . . .)

WORKSHEET #10 (c)

WORD PROCESSING

	Important	Not Important
Right margin justification (perfectly even right-hand margins).		
Spooling (prints one document while working on another).		
Communications capabilities (electronic mail).		
Document oriented (can produce an entire manual. Operator can instantly reference any page without paging through the entire manual.)		
Arithmetic (ability to perform calculations on columns of numbers).		

From Computerease To Computer-ease In Simple Installments

We have already discussed software basics. Here are some more software-related words you'll need to know.

More Software Definitions

Languages. Programming languages are sets of words or symbols used to communicate with the computer. They are divided into two types: low level and high level.

Low Level Languages. Low level languages use numbers or special command words to communicate with the computer instead of English-like words. They often run faster than high level languages, but they are harder to use. There are two types: machine language and assembly language. Machine language uses the binary numbers that are the "native tongue" of the computer. Assembly language uses short mnemonic commands (usually abbreviations of a phrase) to stand for machine language commands.

Operating System. A program that manages the whole system and makes everything work together. It handles all requests for services, so users do not have to determine how things are specifically accomplished by the hardware. Some operating systems are created by the computer manufacturer and are intended only for that machine. Others, like CP/M, can be run on many different computers.

RAM. Random Access Memory. Sometimes called "scratch pad memory" because it is the erasable memory that the computer uses temporarily to handle the task at hand. After a program is finished running, the computer can write over the RAM and reuse it for another program. When the power is turned off, the contents of RAM are lost.

ROM. Read Only Memory. The computer can read the instructions in ROM, but it cannot write over them as with RAM. ROM comes preprogrammed from the factory, often with the operating system.

Systems Utilities. Utilities are programs that handle special chores such as disk backup, updating software, or reorganizing disk storage to create more space.

9
**Make
Computer
Vendors
Pass This
Test**

10
**The
Importance
Of A
Request For
Proposal**

11
**Write A
Better
Contract**

SECTION III:

Finding The Right Vendor

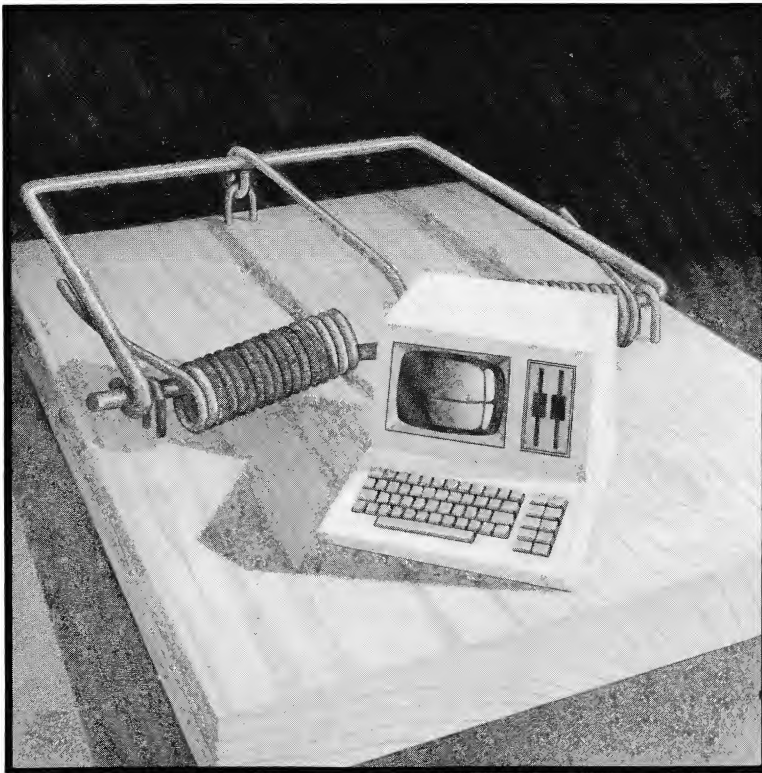
Even for buyers who carefully take the first steps and then find the right software, there is no such thing as a “plug-in-and-forget-it” computer system. Without strong local service and support, your system is guaranteed to be a disaster. This section will steer you around this pitfall.

In Chapter 9 you will learn a quick way to weed out inadequate vendors.

Chapter 10 will help you put several previous worksheets together to make a request for proposal, a document designed to find you the best computer at the best price.

Chapter 11 gives guidelines on a subject that trips up far too many buyers—computer contracts. Unless you do a good job on the contract, you can unwittingly sign away everything you’ve worked for up to this point. Read this chapter twice!

Also in this section: The story of a company that bought the wrong system and had to start all over again.



Chapter Nine

Make Computer Vendors Pass This Test

Don't Get Trapped

Finding the right vendor is almost as important—and as difficult—as finding the right software. Sometimes it seems the only thing growing faster than the number of small computer **users** is the number of small computer **sellers**. Like the machines themselves, those sellers come in all shapes and sizes: manufacturer's reps, systems houses, OEM's, dealers, retail stores, turnkey vendors and more.

Some of them are outstanding professionals. Others, unfortunately, are nothing more than glib retailers who motto is "Move iron!" Like all new and growing industries, computer retailing has attracted some fly-by-night operators. What's more, it has its share of vendors who know all about salesmanship . . . but virtually nothing about computers.

When shopping for small computers, "let the buyer beware" applies as much to choosing the vendor as it does to selecting the equipment itself. Many of the

horror stories making the rounds are about business owners who bought from the wrong supplier—they were sold the wrong equipment; they didn't get the service they needed; the vendor went out of business; the list goes on and on.



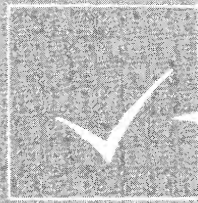
If vendors fail critical parts of this test, it doesn't matter how big they are, how specialized they are, or who their parent firm is.



You can minimize the chances of a starring role in one of those horror stories by making sure that vendors meet certain standards. Even though the good guys don't wear white hats, it **is** possible to tell them apart. Below you'll find a simple test to rate vendors.

If you prefer you can use our dealer test to narrow the field before you send out requests for proposal (RFP's). The request for proposal is explained in detail in the next chapter. Or you can incorporate the test into the RFP itself. You will find two versions at the end of the chapter.

Whether you do it as a separate step or as part of the RFP, don't skip this screening process, no matter who the vendor is. If vendors fail critical parts of this test, it doesn't matter how big they are, how specialized they are, or who their parent firm is.



TIPOFFS



The Ironmonger

The Tipoff: Five minutes into your first visit, the sales representative is already suggesting certain hardware.

The Ripoff: Your computer system should be a **solution**. How can a sales representative propose a solution before he or she knows what the problem is? You should expect a professional sales representative to start by defining what you want to do and locating software to do those jobs. Then and only then should he or she recommend a specific piece of hardware.

The Solution: The more solution-oriented a salesperson is, the better. But if they begin giving solutions before knowing the problems, go elsewhere!

Why Bigger Isn't Necessarily Better

Take the case of the well-known manufacturers. It's true that the giants have excellent reputations, but they earned them selling mainframes and minis, not small computers. Their track records in this market are shorter than those of smaller, more innovative firms. Despite strong support histories for big corporate clients, large manufacturers can be slow and inflexible with small outfits. They often have bigger fish on the hook.

And, unlike some smaller companies, the giants haven't concentrated on narrow, vertical applications. It's rarely hardware that makes the difference to a small computer user. It's software and service—two commodities found as often at small firms as at large ones. Buying from a big-name manufacturer doesn't guarantee

success unless you find out what kind of service you can get for **your** business in **your** area.

Nor can you skip the test for small firms. Some small companies deliver terrific service. Others are understaffed, overworked and, worst of all, undercapitalized. Many of them have gone out of business in the past few years. Beware! When a company fails, its previous customers are usually stranded without support or service.

IDEAS YOU CAN USE

How About Buying From A Computer Store?

You may have heard about computer stores, and wondered if they are good places to buy a small computer. At this stage, our answer is that they aren't any better or worse than other sources. We recommend a rigorous test like the worksheet with this chapter before you buy from a computer store.

Buying from a computer store has some risks: one big one is that the store may be out of business when you need help six months from now. The failure rate has been discouragingly high. Even a spokesperson for the National Association of Computer Stores admitted that "there are a lot of dealers coming in and out of the field right now." Many of the new entrants lack the financing, experience and expertise to succeed.

Buyer worries may be dispelled as stores with names like IBM and Xerox spread across the country. Most of the major computer manufacturers have opened or announced plans for computer stores. Still, these retail outlets are largely experimental. It remains to be seen if manufacturer-owned stores can increase consumer confidence. If they can, we may yet see off-the-shelf "appliance computers."

Despite the uncertainty, many entrepreneurs are betting that retail stores are the

wave of the future. In Southern California, for example, they have established a one-stop-shopping computer mall. A 5,800 square foot Saddleback Valley facility houses a microcomputer store, a minicomputer vendor, a computer supplies store (paper, forms, ribbons, etc.), a self-service software store and a small audio/visual training facility.

Enough about the future. What about current computer stores? Can they pass the dealer test suggested by ACU? According to a recent survey, the answer is a definite **maybe**. The level of available service and support is inconsistent from store to store.

Perhaps in five years retail computer outlets will have established a reliable track record. In the meantime, four walls do not a good reputation make. Buyers should give stores the same careful scrutiny as other potential suppliers.

Delve Deeper

Some people claim that high-quality, professional vendors are the exceptions in today's marketplace. If so, then you should be looking for those exceptions. You must delve deeper into vendors' qualifications. Search out a supplier who will make a commitment to identify your real business needs and then find a system for you that meets those needs. Dealers reveal whether they are good or bad to the extent they are problem solvers.

And you may be able to eliminate some vendors because of financial instability. You don't have to worry about IBM and other giants, but run a credit check on the smaller computer manufacturers and local suppliers. If you have questions about a firm's solvency, get answers before you proceed. Ask for a bank report or a financial statement.

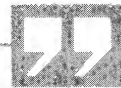
Then give the test below. The answers will come from asking the vendors themselves and from talking to former customers. Don't be shy about asking tough questions. After all, vendors are out to separate you from your cash.

And don't make the mistake of relying on just one or two questions to decide. Although you can't expect anyone to get a perfect score, if you informally "grade" suppliers, you can rank them in the order of their ability to meet your requirements. When you add this ranking to other factors—price, software suitability, hardware suitability—you'll have an equation that makes it easy to decide where to buy.

Once you understand what sets good vendors apart from bad, you are ready to ask for bids. More on that in the next chapter.



Don't be shy about asking tough questions. After all, vendors are out to separate you from your cash.





CONSUMER ALERT

Pitfall #9:

My Friend The Vendor

Most first-time buyers are confused and intimidated by computers. That makes them particularly vulnerable to the old "you can trust me—I'll take care of you" ploy from sales representatives. Because they don't know enough about computers to choose the right one objectively, buyers will often put their blind faith in a vendor they happen to like.

Professional sales representatives know all about this—they call it "the halo effect." If they can convince you that they are good guys, you'll be blinded by their "halos," and you won't put their claims and promises under the X-ray.

No vendor is your friend! Yes, a Chrysler sales representative will try to put you into the Chrysler that suits you best. But no—regardless how nice he or she is—the representative will not tell you that a Ford or Chevrolet would be better for you . . . and certainly will not tell you that all you really need right now is a moped.

This warning may seem like common sense, yet it is one of the most common buying blunders we see.

The Moral: When buying a computer, you've got to be your own best friend.

The Computer Vendor Test

1. How Long Have You Been In Business?

Computer retailing is a volatile field. It's important to find an outfit that will still be around next year. You may not want to disqualify a firm just because it's new, but make certain that it has the right answers to all the other questions. And it never hurts to find out what the people did before selling computers. If they were in computer-related jobs, they may well have the needed technical expertise, or at least know where to get answers. If, on the other hand, they used to sell hot tubs . . . well, draw your own conclusions.

2. Are You Experienced In My Field?

Few firms have the resources or time to develop products for every kind of business. Buying from a specialist increases the chances of getting the right hardware/software/service package. Ask how many business systems the company has installed. Get names and phone numbers. You won't check references at this stage, but do so before making your final choice.

3. Do You Have A Strong Guarantee?

Everybody claims to have a "full guarantee," but some suppliers merely pass along the inadequate hardware warranties of the manufacturers. Better firms offer their own warranty for all components. When paying retail prices, a strong guarantee is one of the things you should expect for your money.

4. Do You Provide Installation?

Installation is more than unpacking and plugging in. Can the firm provide or supervise any necessary changes to the building (dedicated power outlets, air conditioning, etc.)? Will they hit you with an "installation fee" when the machinery arrives? What about software installation—can the company assist with the conversion process to change from your old system to the new computer?

5. Do You Offer Training?

Training is more than handing employees a manual. Can the firm train clerical operators? Teach you or your employees to program? Train management to get the most from the system?

When and where are classes held? (Some vendors like to brag about their "free"

classes, but forget to mention that they are held once a year in Pittsburgh . . . with customers paying the transportation and hotel fees.)

6. Do You Offer Software Support?

Sooner or later—probably sooner—you're going to want to fine-tune the software to fit your business. Does the firm have a programmer on staff to modify the software they sell? Is the programmer based nearby?

This is an important question. At large corporations, 60-80 percent of the programming staff is usually involved in program maintenance. It's to your advantage to find out up front who will maintain *your* programs if they don't work or if you need changes.

7. Do You Have In-House Service?

The reasons for poor service are usually simple. The local service branch may suffer from understaffing, poor management or even an insufficient stock of spare parts. Don't forget that it's the local rather than the national service that must be examined. Ask these questions:

- Do you carry all parts in stock? An in-house service department won't help much if needed parts have to be shipped from the factory.
- Are your technicians factory-certified? Where are they located? (Some vendors have local marketing reps but no nearby service support.)
- Do you have a "hot-line" number users can call to get technical questions answered? In-house technical expertise doesn't do you any good if you can't get to it.

8. Do You Offer A Service Contract?

Service or maintenance contracts are vital to most small computer users.

9. Do You Offer Financing?

Dealers and stores oriented to the home and hobby trade are usually cash and carry operations. A business-oriented vendor, on the other hand, will help you with financing.

10. Will You Put It In Writing?

Most computer vendors are honest. A few, unfortunately, are looking to make a quick buck from naive first-time buyers. Such people don't want to deal with an intelligent, intelligent, well-prepared buyer and they certainly don't want to put their exaggerated promises onto paper. Asking vendors if they will put it in writing is a sincerity test that separates the pros from the fly-by-night operators.

WORKSHEET #11 (a)**VENDOR QUESTIONNAIRE**

Using The Computer Vendor's Test in this chapter, fill in the answers to the following questions. Use the information to narrow down the field of vendors you ask for bids.

-
1. How long has your company been in business?
Credit References:

-
2. List five current customers in my industry.

-
3. Describe your guarantees.
Hardware warranty?
Software warranty?

-
4. Do you provide installation?
Describe:

(Continued . . .)

WORKSHEET #11 (b)

VENDOR QUESTIONNAIRE

5. Do you offer training?

Describe:

Where held?

How long?

Additional charge?

6. Do you have a programmer on staff to maintain and modify the software packages you sell?

7. Do you have in-house service?

Do you keep all parts in stock locally?

Do you have locally-based, factory-certified technicians?

Do you have a hot-line for technical questions?

What is the cost per hour for on-site service?

8. Do you offer a service contract?

Cost?

(Continued . . .)

WORKSHEET #11 (c)

VENDOR QUESTIONNAIRE

9. Do you offer financing?

Credit?

Leasing?

Renting?

10. Will you include proposal terms in a written contract?

Please attach a copy of your standard purchase contract.

From Computerese To Computer-ease In Simple Installments

Data processing types have their own special jargon for anything to do with computers. That includes the process of installing a system. Some of the words relating to computer installation are explained here.

The Process Of Installing A Computer

Conversion. The process of converting the data from your old system to the new computerized system. Usually this involves typing your information into the computer.

Cutover. The point at which the computer system is actually turned on and starts to run and/or the point when you abandon your manual system and begin to depend exclusively on the computer.

Integration. Can mean the process of matching up different hardware and software components so they all work together. Or, it can mean the process of integrating the computer into the day-to-day life of your business.

Parallel Operations. Until the computer has been thoroughly tested and debugged, you must run two systems in parallel—the new computer system and the old manual system as a check. Generally done for two or three months.

Upgrade. Switching to a larger, more powerful system. The easiest way to upgrade is to start off with a computer system that has a clearly defined “upward migration path.” This means that the vendor has designed the system so that it is easy for you to convert from a smaller system to a larger one. Without such provisions, you may lose your entire software investment when you make the switch.



Chapter Ten

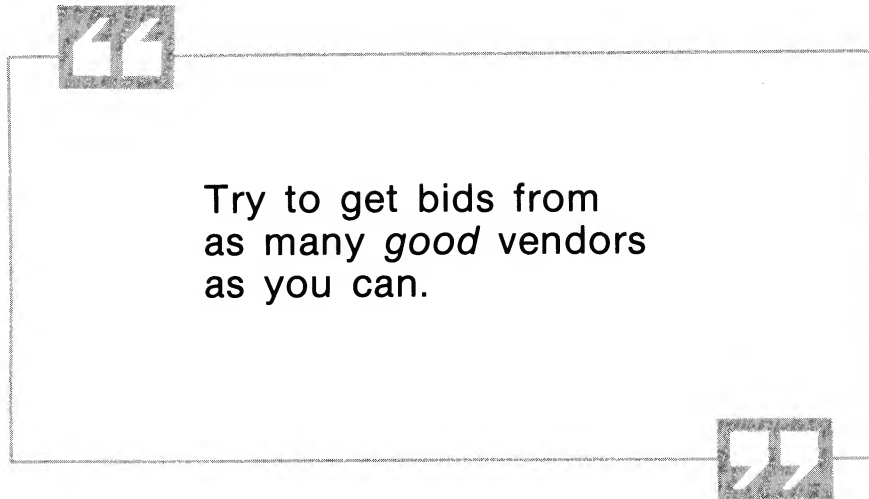
The Importance Of An RFP

*How To Be Properly
Armed With A
Request For Proposal*

The request for proposal (RFP) is a buying method common to the big-computer marketplace. We have adapted it for your use in selecting a small computer. If you will be spending more than \$20,000 for your system, you can use our method just as described in this chapter. If you are buying a less expensive machine, you may find it hard to get vendors to take the time to respond, so you may have to get your answers by visiting computer stores instead of by mail.

Either way, it's well worth your time to go through the worksheet at the end of this chapter, which provides guidelines for creating an RFP of your own. It is probably the most important worksheet in this book, because it brings together all the elements of your buying strategy into a single compact document. At the

same time, this worksheet is one of the easiest to prepare, since much of the preparation has already been done on worksheets from previous chapters.



What is an RFP? In the simple version we have laid out at the end of the chapter, it is a letter to vendors. It spells out what your "ideal" computer system is and asks vendors to make a bid. You're not going to get a perfect system, of course, but the RFP ensures that you will find the one out there that's closest to it.

Some buyers hire a consultant to write their RFP, but most users can do it on their own. If you still feel uncertain after you've finished, hire a consultant to review what you've come up with.



CONSUMER ALERT

Pitfall #10:

Buying A Dead End Machine

When a California paper distributor bought its first computer, the firm was dismayed to discover that the printer was too slow, that there wasn't enough memory to expand the scope of operations and that the machine wasn't fast enough to process the data during peak periods. Unhappily, the system couldn't be expanded. After two years, the company was so fed up it scrapped the system—at a big loss—and started over with a new machine.

The first step in acquiring a computer system is to determine your requirements, including expected growth. All computer hardware has power and expansion limitations. Software has limitations, too.

Too many buyers wait until after they've signed the check before casting a critical eye on the limits of their small computer. Determine your growth needs **before** you buy, and purchase a system that can expand as needed.

The Moral: Unless you plan for expansion, your new computer will eventually become a dead-end machine that blocks you from further growth.

The Importance Of An RFP

The RFP is vitally important to the success of your computer shopping expedition:

- **It crystallizes your goals and requirements.** The process of filling out the worksheet will make you far more prepared and knowledgeable than most first-time buyers. That's why it is worth the time **even if you never show it to a single vendor.**

- **It simplifies your decision.** The number of hardware/software/service combinations is dizzying. Without a yardstick to measure the various features, your final evaluation will become a classic case of comparing apples to oranges.
- **It saves time.** You get the information you need from vendors in writing, and in the order you prefer. And because you give the same information to competing vendors, you eliminate repetitive interviews.
- **It reduces errors.** There is less chance of overlooking important factors.
- **It lessens the chances for disagreements and lawsuits.** The vendor will know what you really expect. You may even incorporate portions of the RFP into the contract.



CASE HISTORY

WHAT CAN I LEARN?

Phil & Jim's TV And Appliances

This case history features a company that successfully automated despite making an all-too-common buying blunder—buying a dead-end machine.

Phil & Jim's is a \$13 million operation with four stores and more than 60 employees based in Huntington Beach, California. The company is already on its second computer, having outgrown their first system in less than 6 months. Because the first computer couldn't expand as needed, Phil & Jim's was forced to start from scratch with a new system.

The second time around the firm spent about \$100,000 for a turnkey system from Business Automation of Anaheim, California. The price breaks down to about 50 percent for the hardware and 50 percent for the software. The system is quite

extensive and extends into virtually every area of the business. Some of the more important functions include:

- Inventory
- Order entry
- Purchase ordering
- Store accounting
- Accounts receivable
- Accounts payable
- General ledger
- Payroll
- Sales history
- Sales forecasting

One of the system's benefits is that it saves time. "It used to take two clerks three days to do the payroll and assemble the books," says controller Bob Sklar. "Now one or two people can do it in less than three **hours** including all the government forms, the balance sheet and all the journals for the entire month."

An even more important benefit, according to Sklar, is better management information. "A TV and appliance dealer has so much data that the only way to control it is with a computer," he says. "You just couldn't get enough people sitting at a desk to give you all the reports you need." Better management information means a better bottom line. Sklar says that Phil & Jim's gross margin jumped two percent after installation of the current system.

Sklar cites a number of reports that have helped management get better control over the business, including sales forecasts (by sales representative, product, brand or location), inventory reports, past due purchase order items, undelivered sales analyses, sales summaries, sales and profits analyses and many others. Such reports make buying decisions much easier. "We can compare actual sales versus forecast," says Sklar. "We can tell how well a particular brand is moving. It has really improved our turnover, and we have been able to trim our inventory costs."

Despite the success of Phil & Jim's current system, Sklar emphasizes that his company made some expensive mistakes the first time around. He cautions other buyers to do their homework before they buy.

"Most people buy the wrong system the first time around," he summarizes. "Sure, you might get lucky, but most people don't know enough to buy intelligently; they just take the word of the sales rep. They end up being sold instead of buying—and there's a big difference."

Who Should You Send It To?

Ideally, you should send copies of your RFP to at least three hardware manufacturers, three turnkey vendors, three software houses and three service companies. In reality, you are unlikely to have such a wide choice after you've finished all your preliminary screenings. Don't waste your time by sending the RFP to unqualified prospects, but do try to get bids from as many **good** vendors as you can find.

Don't Get Discouraged

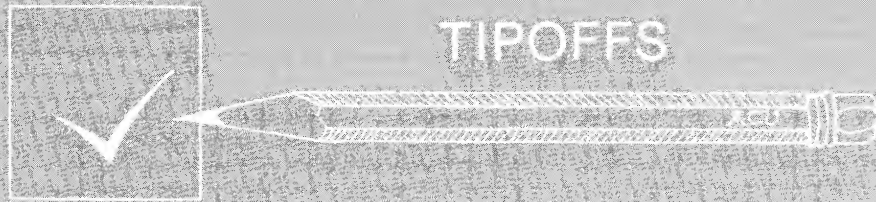
Don't get discouraged if you have a low response to your RFP's. Think of it as an additional screening process. Some vendors won't want to participate in an RFP—because they know they'll lose! And ask yourself this: If a vendor won't spend a half hour to fill in some blanks, how will he or she respond to your needs as a customer?

You have a better chance of getting responses if you make preliminary phone calls first. Phone prospects and outline the basics of the system you want. Ask them if they'd be willing to give you a bid in writing. Point out that you realize that no one's system will be perfect, but you want to see how close they can come.

When you make those preliminary calls you will (1) eliminate those who can't bid because they don't sell what you need; (2) eliminate those who won't bid because they don't want your business badly enough; and (3) get the name of someone to whom you can address the RFP.

Even with this extra effort, buyers in remote areas and those who want inexpensive microcomputers may have trouble convincing vendors to respond. If you can't get enough bids to make comparisons, you may have to carry your RFP into a few computer stores and get the answers by grilling the manager.

Our advice: Don't decide on a system until you get answers—one way or another—to every question on the RFP.



Money Talks

The Tipoff: The sales representative: "Now if you'll just give me your check for 50 percent of the purchase price, we'll place the order and . . ."

The Ripoff: If you give the vendor too much money up front, you destroy the incentive to perform. Some contracts are scheduled so that 75 percent of the total is paid before the buyer has tested the system. You shouldn't pay more than 10 percent down, or more than 25 percent before acceptance testing.

The Solution: Structure the payment schedule so that the vendor has a financial reason to work hard in your behalf. Money talks.

WORKSHEET #12 (a)**REQUEST FOR PROPOSAL**

Your request for proposal doesn't have to be complicated or fancy. Basically, it consists of a cover letter, a description of your business and a description of the features you want. In all, there are five sections: (1) cover letter, (2) description of business, (3) software, (4) hardware, (5) service support. You will be reusing the worksheets from Chapters 4, 8, 9 and 12.

COVER LETTER

Put the cover letter on your company's letterhead. Include these points:

- You are serious about buying a computer system and have not yet decided from whom you will make the purchase.
- You will not ask them to guarantee prices until the actual contract has been signed.
- You want the vendor to come as close as possible to the system described. You will be glad to consider alternatives, if they are sent to you separately.
- You will ask to see local demonstrations of the final candidates.
- They should include the delivery date for the system they propose, and they should attach applicable sales literature.
- Specify a deadline date for submitting the bid (allow at least four weeks).

DESCRIPTION OF BUSINESS

Use plain white paper for the remainder of the RFP, typing it so vendors can simply fill in the blanks. Send each prospect two photocopies of this portion, one to return to you, and the second for their own records.

The introductory paragraph for this section should describe the type of business you are in—the industry, the number of locations, the number of employees, your primary products or services, your sales territory, and so on.

Next, retype the relevant information from Worksheets #2 and #3 in Chapter 4. These figures will give the vendor a good idea of the size of your operation. Explain that the hardware and software must be capable of handling the workload shown here, including growth requirements.

(Continued . . .)

WORKSHEET #12 (b)**REQUEST FOR PROPOSAL****SOFTWARE**

Begin the software section with these questions about systems software:

- Operating systems included?
- Price?
- How many concurrent jobs will it support?
- How many terminals will it support?
- How many floppy disk drives will it support?
- How many hard disk drives will it support?
- Languages included?

Next, insert a paragraph outlining your software strategy. We suggest that you ask the vendor to propose software packages. If he or she has nothing available to meet your specifications, you will consider modified packages. Only as a last resort will you consider custom programming.

At this point you can attach your software shopping lists that you've developed for your applications from Chapter 8. Leave spaces for the vendor to insert the name and price of the package he or she proposes.

HARDWARE

In your introductory paragraph to this section, tell vendors that it's up to them to configure the system as they see fit as long as it has the power to handle your workload. Ask vendors to list individual components and prices separately (so if one vendor suggests two terminals and another suggests three, you'll be able to compare the bids).

Next, include your list of minimum requirements from Worksheet #14 in Chapter 12. Then leave space for the vendors to set out the equipment configuration they propose.

SERVICE AND SUPPORT

Retype from Worksheet #11 in Chapter 9 the specific questions you would like each vendor to answer.

From Computerease To Computer-ease In Simple Installments

You already know that buying an in-house computer is an increasingly popular way of getting computer power. Where do you look for a computer system?

The ideal method is to locate a turnkey vendor who can sell you a hardware/software/service package that will do everything necessary from the moment it's turned on. For most business owners, however, turnkey systems are not yet an everyday reality. Most firms end up buying their computer power in pieces—the hardware from one source, the software and service from others.

You'll encounter a bewildering array of places to shop when you start your search. Here's a list of sources that can provide all or part of a computer system.

Computer Sources

Consultants. A computer consultant's main product should really be advice, but some of them sell other things, too. Consultants can't make much of a pretense of objectivity if they sell hardware (although some of them do it out the back door anyway), but many consultants also double as contract programmers.

Contract Programmer. These individuals supply programming services. Usually they work on a specific job, writing the software for a particular task. Sometimes they hire themselves out to work under the direction of the purchaser's own data processing staff.

Computer Store. Just what the name implies. Some are independent stores that carry a variety of product lines, including software and supplies. Some cater to hobbyists, others to serious business owners. Some are part of a large chain (such as Computerland) and some of them are owned and operated by a manufacturer, such as Radio Shack, Xerox or IBM. In the latter case, they generally (but not always) only carry equipment made by that manufacturer.

Dealer. This name covers several different activities. Generally, the words "authorized dealer" means an independent organization that has been approved to sell and service a particular brand of computer. They almost always sell software as

well as hardware. Some computer dealers operate from stores. Others maintain an office and an outside sales force.

Mail Order. Many computers can be purchased at discount prices through mail order outlets. Although there are many reputable firms that sell computers through the mail, we recommend that first time buyers avoid it. Because of their low prices and their distant locations, mail order houses can't give you the needed level of support.

Manufacturer. Some computers can be purchased only through authorized retail outlets, but many computer companies employ a direct sales force. Based in regional offices, these outside sales representatives will come to your place of business to give you a sales presentation. Occasionally they can sell you a complete system including applications software. Usually, though, they provide only hardware, systems software and service.

OEM (Original Equipment Manufacturer). Although this sounds like it means those who make hardware, it generally refers to firms that purchase hardware from someone else, then combine it with other equipment and/or software to make a more complete product. Some OEM's sell turnkey systems.

Systems House. Although this sounds like it sells complete systems, the emphasis is generally on software. Some systems houses, though, are not much different from OEM's, assembling hardware/software packages from various sources.

Turnkey Vendor. Any supplier that sells a complete system might be called a turnkey vendor. Usually a turnkey vendor concentrates on "vertical markets," specific industries or professions whose members all have similar computer requirements. Grain elevators, trucking firms, and dentists are examples of vertical markets.

Vendor. As used in this book, anyone who sells anything to do with computers. All the sources listed above qualify as vendors.



Chapter Eleven

Write A Better Contract

If you've come this far in our book, you've spent more time and effort on computerization than most first-time buyers. Don't waste your efforts by letting down your guard and getting careless with your last moves. Turn your research and your newly acquired know-how into a contract that will protect your interests.

We've chosen to put contract negotiations at this point in the book, even though you won't actually sign a contract until you've made your final decision (as explained in Chapter 13). In this way, you can have our suggested contract provisions in mind before you make your selection. Although formal negotiations take place late in the game, an informal give-and-take starts the first time you speak to a sales representative. Most first-time buyers don't realize what to ask for, or what's at stake in this game.

This chapter will give you the tools to hold your own in the bargaining. It is not

a substitute for legal advice. The list of suggested contract provisions at the end of the chapter should serve as a starting point, something for you and your attorney to strive for. By all means, ***show your contract to an attorney before you sign.***



CONSUMER ALERT

Pitfall #11:

Buying With An Inadequate Contract

Many normally cautious business owners who would not think of buying real estate without consulting an attorney, never ask legal advice before signing a computer contract. Some buyers don't sign ***any*** contract. Others sign one that is heavily slanted in the vendor's favor, because the vendor tells them that it is "company policy" to use a standard contract and no other.

Don't believe it.

The Moral: You don't have to accept the standard contract. Get legal advice and insist on a contract that protects your interests.

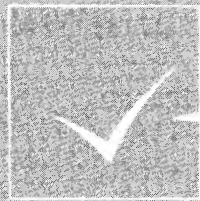
A Common Blunder

"But wait a minute," you say. "Why all the fuss? Don't vendors have standard contracts that cover everything?" Vendors have standard contracts all right, ones that have been honed to perfection by a staff of legal experts. The only thing such a contract covers for sure is the vendor's backside. Some of them are so unfairly slanted against the buyer that they've actually been thrown out of court.

The standard document is the vendor's idea of an ideal contract—it gives **the vendor** the maximum amount of protection. You don't have to accept it.

Counter with your version of an ideal contract, using your attorney's advice and the list at the end of this chapter. From there, you can reach a compromise agreement.

One more time—**you don't have to sign the standard contract!** There are literally thousands of buyers out there who are kicking themselves for falling into this trap. They signed the standard document, then found themselves helpless when things went wrong. Although the details of these horror stories vary, they usually have one thing in common—the buyers failed to get the vendors' promises in writing.



TIPOFFS

The "Purchase Order" That's Really A Contract

The Tipoff: The sales representative: "If you want to get in line for early delivery, you'll have to sign our standard purchase order. That way you'll get an order number. Meanwhile, we can wrap up the other details of the system."

The Ripoff: Take a close look at that purchase order! It's probably got a fine-print contract on the back. You may think that you are merely "getting in line" for an important piece of equipment in case you decide to go ahead with the total system, but you may have locked yourself into a purchase.

The Solution: If you can't avoid signing a purchase order, run it past your attorney first. He or she will show you what wording to put on the front so that it will be subject to a contract to be mutually agreed upon at a later date.



If your rights aren't in writing . . . you don't have any.



Righting Wrongs Vs. Writing Rights

In theory, a vendor's verbal representations are legally binding if they can be substantiated. In theory, unhappy buyers can go to court and ask the judge to right the wrongs done to them.

In practice, making an oral promise stick is virtually impossible. Moreover, standard contracts contain a fine-print disclaimer called the "entirety" or "merger" clause. It states that the vendor is bound only by what's in writing in the contract. The sales representative's promises, the sales brochures given you, the letters sent, the feasibility studies conducted—the entirety clause says the vendor cannot be held responsible for any of these unless they are attached to the contract.

So here's the rule for computer buyers: What you see is what you get. If your rights aren't in writing . . . you don't have any. Smart computer consumers insist that vendors discuss only what they are willing to put on paper. "With our system," the smiling sales representative says, "your clerk can do all of your month-end bookkeeping in less than one day." "Terrific!" you reply. "Will you put that in writing?"

Still, we aren't suggesting that you prepare a contract with an eye toward taking the vendor to court some day. If you have to go to court to win, you've already lost. Even if you get a favorable verdict three or four years down the road, you'll never recover all your costs.

Instead, think of a contract as a sincerity test. Don't be disappointed or surprised if some vendors fail. The business market for small computers is where the money is right now, so most vendors are making business noises. When asked to put it in writing, some of them change their tune. Now is the time to find out if your dealer really means what he or she says—and to look for a better one if the answer is no.

And think of the contract as a mechanism to clarify your agreements. It anticipates future problems and sets forth remedies. You may decide to do business with a vendor even though he or she won't go along with all the provisions you want, but you'll be doing business with your eyes open.

“Fit To Be Tried”

Try to get all the provisions on the following worksheet into the contract you sign. Don't, however, expect to get everything you want. Ask for as much protection as possible, but be willing to make tradeoffs.

More advice: Don't try to negotiate after you've signed a purchase order or told the vendor he or she sells the only system you really like. Once he or she thinks a sale is sewn up, your leverage drops to zero. To have any chance at all you've got to negotiate early, before all your cards are on the table. If you want to get the best terms and price, keep the vendors competing until the last minute.

WORKSHEET #13 (a)**CONTRACT PROVISIONS****Desirable Contract
Provisions:****Check If
Included In
Your Contract:****1. Detailed Specifications**

This is the most important part of the contract and the most frequently overlooked. First-time buyers often settle for a contract that reads "Vendor promises to deliver one Abracadabra Computer with Magic Accountant software." To fulfill such a contract, all a vendor has to do is drop off a box of equipment and a diskette!

Much better is a contract that lists the specific jobs the computer is represented to do: "Accounts receivable program will process 300 accounts and print an aged trial balance within 30 minutes and is fully integrated with general ledger" is a detailed specification; so is "The printer is a daisywheel model with interchangeable print wheel and capable of printing 45 characters per second of typewriter-quality print."

In a nutshell: Most of the items from the RFP you prepared in the last chapter should be made part of the contract.

2. Specific Responsibility of Multi-Vendors

Many computer vendors assemble systems using equipment from several different sources. If the system goes down, the service reps for one company put the blame on the other manufacturers' components. You don't have time for these arguments. Ask the vendor to state in writing that he or she will handle all warranty and service problems.

3. Acceptance Testing

A computer is not like a refrigerator. Don't let the vendor get away with dropping it off in your back room and sticking you with the payments whether it works or not. First, your contract should place the transportation risk upon the vendor. They should insure the shipment and guarantee that it will arrive safely at your door.

Second, insist on the right to test the system before making final payment. Spell out clearly how much time you have to check out all components, including software. Even if you are installing the computer yourself, you should be able to arrange a test on the dealer's premises.

4. Financial Conditions

Set forth the exact purchase price, when payments are due, and that you are not liable for any charges other than those stated in the

(Continued . . .)

WORKSHEET #13 (b)**CONTRACT PROVISIONS**

agreement (some standard contract forms amount to a blank check for the vendor, allowing him or her to invoice you for additional charges "as incurred"). Don't leave out software rental charges, supplies, service agreements, site preparations, training or any other hidden costs that can be jacked up after you've committed yourself to the hardware itself. If you can get away with it, stipulate that price cuts made by the manufacturer before delivery will be passed along to you.

When making financial arrangements, remember that it's never wise to give all your money up front, for the dealer no longer has any incentive to keep you happy. Don't pay more than 25 percent before final acceptance.

5. Delivery Dates

You should have the right to get your deposit or lease payments back in full if the dealer fails to meet the deadline. Watch out for the fine print on this one: some agreements contain non-refundable "restocking charges" or "security deposits".

6. Legal Recourse

Your contract should state how vendor-purchaser disputes will be resolved. At the very least, make certain that the contract does not take away any of your rights to legal recourse. You may want to insert an arbitration clause, since binding arbitration is generally much cheaper and faster than legal proceedings.

7. Tax Credits

At the time of this writing, the IRS allows an investment tax credit equal to 10 percent of your computer investment. Software can usually be included if it is part of the total purchase price. If you prefer to treat software as an expense, make sure that it is separately invoiced and treated as a license agreement, not as an outright purchase. If you are leasing, ask that the investment tax credit be passed along to you.

8. Service Costs

Spell it out. Who will service the equipment? Where? Must you bring it to the outlet or can you get on-site service? What are the hours? How long will you have to wait? What happens when the warranty expires? If the dealer has made promises, get them in writing.

9. Warranty

Many warranties are virtually worthless because the contract doesn't include any detailed specifications. Software is usually described in

(Continued . . .)

WORKSHEET #13 (c)**CONTRACT PROVISIONS**

vague, general language that ignores all the marketing claims made for it. Since it's not clear what the software is supposed to accomplish, there's no way to enforce the agreement.

Any good warranty will require the vendor to repair or replace the hardware and software over a certain time period. Read the fine print carefully—you'll be amazed what most standard contracts exclude. For example, most exclude "consequential damages." If the program makes so many mistakes that it puts you out of business—and this has actually happened in a few cases—you'll get a new program, but you cannot collect for your business losses. Try to eliminate this clause, or at least soften its impact.

10. Leasing Considerations.

If you are leasing, you will be confronted with some type of standard contract. Check to see if there are cancellation penalties and if you can upgrade equipment during the lease term. And ask for a provision that lets you purchase the equipment at the end of the lease.

Also spell out what happens if the equipment fails to perform as promised. Do you have to go on paying a third party leasing company for a computer that doesn't work? Some buyers have been trapped this way.

11. Software

Who owns it? This is particularly important if you are signing up with an outside service company, or if there is custom programming involved. It's reasonable to expect the vendor to retain the copyright, but some vendors sell a license that is not transferable, even if you simply move to a new location.

It's not a bad idea to get a clause that allows you to get the source code if the vendor goes out of business or fails to perform. That way, you can at least have the software modified yourself.

12. Seller's Expertise.

Try to insert a clause that the buyer relies on the seller's expertise in deciding what to buy. This wording may give you additional protection under the Uniform Commercial Code.

13. Remedies.

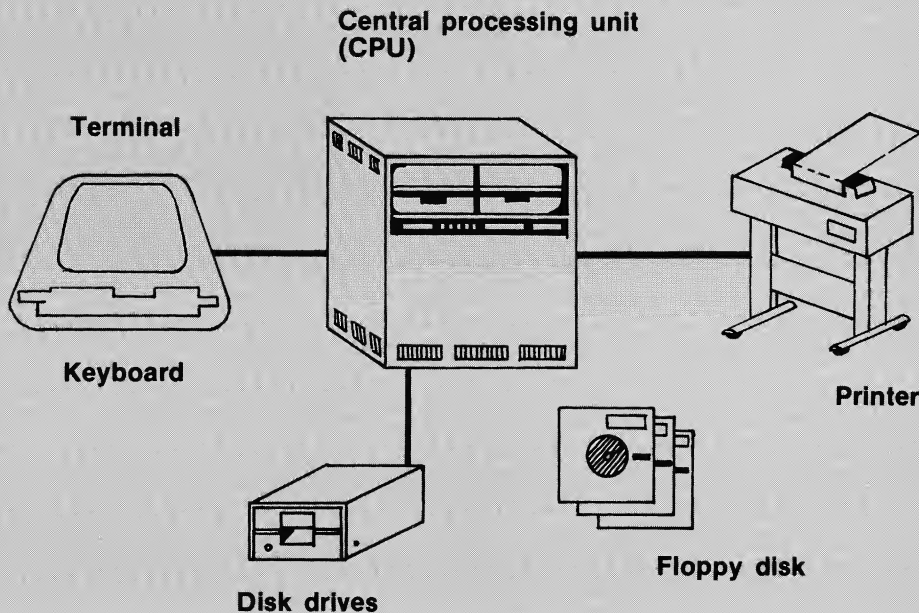
Most vendors are happy to discuss the remedies if you fail to perform, but balk at talking about their own possible failures. For example, their contract may call for you to pay interest if you are late with payments, but they are rarely willing to talk about penalties if **they** are late with delivery. At the very least, try to ensure that you have the right to withhold payments until the vendor performs.

From Computerease To Computer-ease In Simple Installments

So far we haven't said much about the computer itself. Here is a look at basic hardware components.

Hardware Basics

Software tells the computer what to do. The **hardware** is the machinery that does it. Under this name we include all the actual equipment. The drawing below shows some of the hardware common to most computer systems.



The **video terminal** is a means to communicate with the computer. With the **keyboard** we can type in information and instructions. On the **video screen** (also

called the **CRT** for Cathode Ray Tube), we can see what we've typed and read the computer's responses.

The **central processing unit (CPU)** is the heart of the system. It contains the "brains" of the computer, the electronic circuitry that receives and carries out the instructions from the software. In small desktop computers, the CPU is contained within the video terminal. In most systems, it resides in a separate enclosure, as shown in the drawing.

After processing the data, you can get a permanent copy using the **printer**. If you use your computer to do word processing, then you will need a **letter-quality printer**, one which puts out copy that looks like it came from a typewriter. If you don't need typewriter-quality print, you can get by with a cheaper and usually faster **dot-matrix printer**, which forms letters from tiny dots. Dot-matrix printers are just fine for accounting, but you can't use them for correspondence (unless you don't mind that your letters will look like a computer printout).

To enter programs into the computer, and to store the results afterwards, we use **disk drives**. The drives read and write information onto **floppy disks**, plastic disks about the size of a 45 rpm record that are coated with a magnetic material like that used for tape recordings. Some systems use other magnetic devices to store data, including magnetic tape, hard disks and cartridge drives. Most of these alternative methods can store more information than a floppy disk, but they perform the same basic function.

The components described above are everything that makes up a typical "back office" computer system. Retailers and distributors also use **point-of-sale (POS) terminals** that serve both as cash registers and as data entry devices. In some cases, electronic cash registers are connected directly to the CPU. In other cases, the registers contain a disk drive or magnetic tape; transactions are recorded as they occur, then periodically transferred to the computer. Either way, a POS terminal saves the time and trouble of retyping sales information into the computer.

Some POS terminals are equipped with **optical character recognition (OCR)** equipment. Often these devices come in the form of "wands" that can recognize specially printed characters or bar codes. By passing a wand over the bar code, for example, the entire merchandise code can be entered into the computer in an instant.

Hardware and software both come with **documentation**, the instruction manuals that tell you how to set up and use the equipment and the programs. Documentation is an important—but often overlooked—part of a quality computer system.

SECTION IV:

12 **Evaluating Computer Hardware**

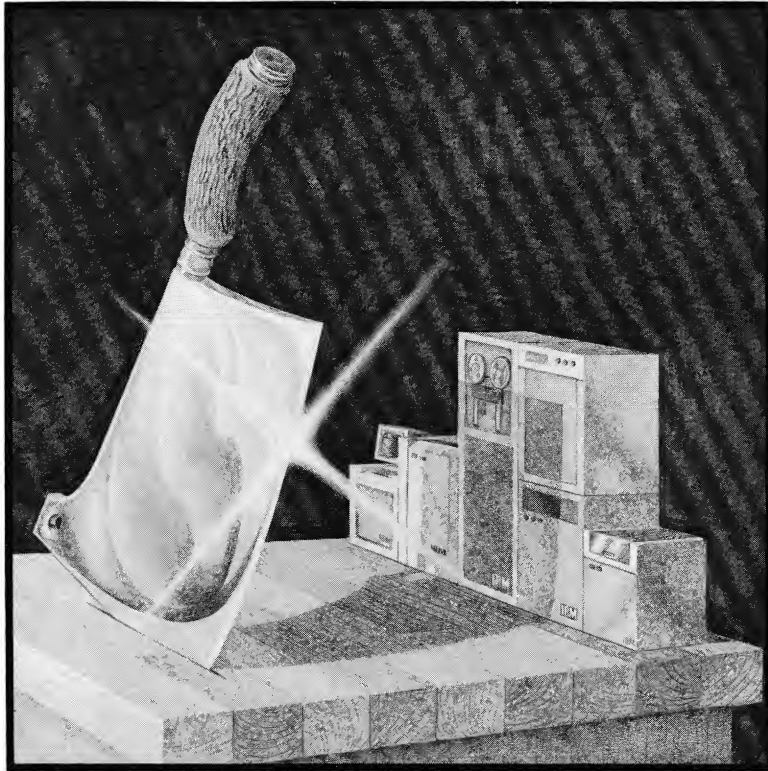
13 **Making The Final Decision**

Finding The Right Hardware

Now that you have taken the first steps, found the right software and found the right vendor, you are ready to find the right hardware, as we explain in this section.

Chapter 12 gives you specific suggestions on what to look for. Using these guidelines, you will be able to pinpoint what's important and what's not.

Chapter 13 brings it all together so you can evaluate the systems you are considering. Many first-time buyers start out as objective shoppers, but end up purchasing on the basis of emotion. This chapter will help you ensure a businesslike decision, with the help of worksheets that summarize everything we've done so far.



Chapter Twelve

Evaluating Computer Hardware

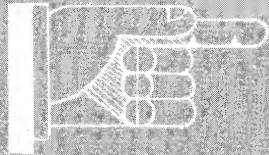
How To Sharpen Your Standards

Up to this point, we've explained how to evaluate software and how to evaluate vendors. In this chapter, we'll give you some tools to appraise hardware. Later on we'll demonstrate how to bring all these evaluations together to make the final decision about which computer system to buy.

As with software and vendors, computer hardware should meet certain minimum standards. We've listed those standards on Worksheet #14, which you may want to refer to repeatedly during your acquisition process. Early on, you may want to check sales brochures against it to eliminate low-quality systems from contention. It may come in handy again when you attend demonstrations. And you can also attach it to the request for proposal from Chapter 10 so vendors know what you are looking for.

Another point to remember: expandability is a crucial factor. With an expandable

system, you pay only for the computing power you need. Your computer grows along with you.



CONSUMER ALERT

Pitfall #12: Buying Without A Test Drive

A Michigan firm recently had to go to court against a computer manufacturer. It seems the company took a sales representative's word that the computer he was selling would run the needed programs twice as fast as the current system. You've probably guessed what happened when the system was actually installed. It ran **slower**, not faster. All in all, a costly mess.

Don't rely on promises and fancy sales brochures. Go for a thorough test drive—a hands-on trial on the exact same model and configuration that you are proposing to buy. The test drive is not just intended to find out how fast the system works. It's equally important to discover how easy it is to use. If you fail to test drive your computer system before you buy, you're going to have a rocky road ahead.

The Moral: In God you can trust. Everything else . . . you should **test**.

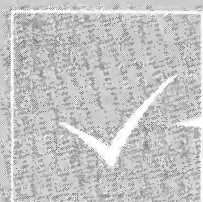
The 8-Bit Vs. 16-Bit Debate

Expandability depends in part on the type of central processing unit, or "chip," in the computer. Until recently, 8-bit chips were the standard for inexpensive microcomputers, with 16-bit chips reserved for larger minicomputers. Now, however, it appears that 16-bit micros are the wave of the future.

Sixteen-bit systems are more expandable than their 8-bit cousins. They can

handle larger programs; they can do more jobs at the same time; and they have more “throughput.” On the other hand, 16-bit systems are more expensive particularly when software is added in.

Granted, a 16-bit program can usually do more and do it faster than an 8-bit version. Most users, however, won’t really notice the difference in speed, nor will the extra power make much difference. What’s more, many 8-bit machines can be tied together into networks that are as powerful as many larger computers. Our advice: Don’t be afraid to go with an 8-bit system if it offers the software and the expandability you need.



TIPOFFS

What You See Is Not What You Get

The Tipoff: At a demonstration, the vendor implies that the demo proves the speed or throughput of the system.

The Ripoff: Demos are great for judging completeness, quality and ease-of-use. They are not the place, however, to verify speed or power. Conditions are rarely the same as the ones you will find in your office.

- You may be seeing the software on different equipment. For example, using a hard disk instead of floppy disks can greatly improve the response of a system.
- You may be seeing different software. Demo programs are often skeleton systems with incomplete features and functions.
- You may be seeing the same hardware and software, but under different conditions. Demo programs usually have only a fraction of the files and data that you will be using. Or you may be seeing the system with a single terminal. Hooking up the multiple terminals you plan to use may greatly degrade the performance.

The Solution: If your application is time-critical, you should get written guarantees that the computer will meet your standards.

Using The Worksheet

Any serious business systems should have **all** the “must have” features listed in this chapter’s worksheet. A computer missing any of these features is probably a home and hobby machine that shouldn’t be brought to the office.

Remember that you are interested in products, not promises. Consider only what the company has out now. Despite the best of intentions, a good percentage of planned products never make it past the design stage. This is as true for the giant manufacturers as for the smaller firms.



CASE HISTORY

WHAT CAN I LEARN?

A. I. Smith Electrical Contractors

“Our computer saves time and increases productivity inside the office,” says Steven Smith, secretary/treasurer of A.I. Smith Electrical Contractors, Brooklyn, NY. His firm employs about 150 electricians. “It’s pretty tough to increase productivity outside; we already get about as much out of our employees as we can. So the only place to increase it is in the office, and these machines help tremendously.”

A.I. Smith recently bought a Radio Shack Model II and spent about \$15,000 on hardware and software. Steven Smith mentions word processing as one way the computer saves time in the office. “One day we had to type up 15 change orders for a public construction project. The letter was the same, but the amounts and numbers were different. With our word processing software, all we had to do was make a standard letter and plug in the correct amounts.”

The computer also helps the company track its accounts receivable. “We have about 300 receivables totalling roughly \$300,000. We knew it was out there, but we

didn't always know where it was. Now we know who owes what, what has and hasn't been paid and who is overdue. One account has about 150 bills alone. To go through that manually would take a half day. The computer can do it at the touch of a button."

A small computer can also save a contractor time in applications like payroll and job costing. Steven Smith admits, however, that the computer hasn't replaced any humans. "A computer really doesn't eliminate a job, it allows you to increase capacity without increasing personnel."

Smith also warns buyers that they face a period of confusion when they start shopping around for their first machine. "When we first started trying to make comparisons, we had a difficult time of it. The sales representatives all used jargon, and they all used different jargon. Now that we have a machine in the office, we don't have that much trouble understanding things."

"In fact," he comments, "it's easier to get along with the machine than with most sales reps!"

WORKSHEET #14 (a)

HARDWARE STANDARDS

Central Processing Unit

Must have:

- _____ **64K RAM (or at least expandable to 64K).** Any less and you risk running out of memory with complex programs.
- _____ **"Understands" BASIC and COBOL.** Some computers only work with the manufacturer's unique language, and that limits your ability to find custom programmers, if needed. BASIC and COBOL are the two most important languages, but FORTRAN, RPG and Pascal are also valuable.
- _____ **Operates in a standard office environment.** Doesn't need special air conditioners, filters or power supplies.
- _____ **Multi-user option.** Can handle more than one terminal, or form part of a network. Even if you don't need data processing in several locations now, you probably will someday.
- _____ **"Standard" operating system option.** You don't have to start with an industry-standard operating system, but having the option gives you access to a large library of software making your equipment more versatile and flexible. In the 8-bit world, CP/M is the *de facto* standard. In the 16-bit world, look for the UNIX operating system, or for any of several operating systems that are compatible with CP/M.
- _____ **Communications option.** Should have the capability of "talking" to other computers.

Data Storage

Must have:

- _____ **Easy backup.** You *must* backup your computer files for safety, but some systems have extremely expensive backup schemes. A second floppy disk drive is usually cheapest. Ask how long it will take and how much it will cost to back up a year's worth of data.
- _____ **Expansion capacity.** At least 50 percent greater than you will need within the next 3 years.

Nice to have:

- _____ **Double-density floppy disks.** Speeds access time and stores more data on one disk, saving on the cost of diskettes.

(Continued . . .)

WORKSHEET #14 (b)**HARDWARE STANDARDS****Keyboard***Must have:*

_____ **Conventional typewriter layout.**

_____ **Separate numeric keypad.** Don't subject your operators to the tedium of keying in data with the numbers on a standard typewriter keyboard. Look for a terminal with a separate 10-key pad.

Nice to have:

_____ **Special function keys.** It's helpful if the keyboard has a few extra keys that can be programmed to do a special job at a single keystroke.

Video Terminal*Must have:*

_____ **Non-glare screen.** Glare from the screen can cause headaches and eye-strain. Look for coated glass or a polarized filter to reduce this problem.

_____ **Full-size screen.** It should have at least 24 lines of 80 characters each.

_____ **Upper and lowercase.** Some computers show only uppercase letters on the screen, which is unacceptable in most business environments.

Nice to have:

_____ **Reverse video.** Shows black letters against a white background.

Printer*Must have:*

_____ **Pin feed or tractor feed options.** These options allow fan-fold paper to be automatically fed through the machine for high-speed printing.

_____ **Letter-quality.** If you only have one printer, make it a letter-quality printer, so that you can use the computer for word processing when needed.

(Continued . . .)

WORKSHEET #14 (c)

HARDWARE STANDARDS

_____ **Upper and lowercase.**

_____ **Designed for use with a computer.** Don't settle for a typewriter that's been rigged to print from a computer. It will be slow and prone to breakdowns.

Nice to have:

_____ **Capable of multiple copies.**

_____ **Will accept special forms.** Invoices, labels, checks, etc.

_____ **Proportional spacing.** Resembles professional typesetting.

_____ **Graphics capability.** Prints individual dots to make graphs, pictures.

From Computerese To Computer-ease In Simple Installments

The hardware basics you've already learned should be enough to get you through most situations. You may, however, need to understand some of the words below when speaking with programmers or sales representatives. The second half of this list is in the next chapter.

Hardware Terms—Part One

Buffer. A place to store information temporarily until the computer is ready to do something with it. The keyboard, for example, may have a buffer to store the keystrokes when a typist goes too fast for the computer to keep up. Printers and other peripherals can have buffers, too.

CPS. Characters Per Second. One way to measure the speed of computer printers.

Cursor. A square of light, an underline or a hollow square on the computer screen that tells you where the next character will appear on the computer's screen. Most cursors blink to make them easier to spot.

Dual Density. Also called double density. Describes disk drives that pack in about twice the amount of information in the same space as a single density unit. There are also a few quad-density drives on the market that store four times as much information.

Electrostatic Printer. A type of printer that uses an electric charge to create characters on specially-coated paper. Although very quiet, they are usually not practical for business applications.

Hard Copy. A printed copy of the computer's output.

Hard Disk. A physically-rigid disk. Hard disks spin faster than floppy disks and hold more information. Although more expensive than floppy drives, they are often necessary for all but the smallest business applications.



Chapter Thirteen

Making The Final Decision

In this final chapter, we'll wrap it all up by describing a simple technique to help you decide which computer system to buy. Our discussion will assume that you have taken the preliminary steps outlined in the previous chapters. You've weeded out the inadequate systems, and now you want to know which of the remaining candidates is the best choice. Even if you have only one vendor left on your list, you've still got an important decision to make—a choice between that vendor and not computerizing at all.

Don't forget that second option. It may be too soon for you to automate. So even if you have only one bona-fide contender, you owe it to yourself to go through the process described below. It includes talks with users and real-life demos. If you don't like what you see, you can always decide to postpone buying until something better comes along.

If you do have several systems to choose from, then the objective, decision-making process set forth in this chapter is even more important. Far too many computers are bought on emotion rather than hard facts. In order to make the final decision, it's important to use a formal, **written** rating system. Making the final decision is too complicated to "do in your head." Nor can you do it properly just by reading through the requests for proposal (RFP's). Although you should be able to spot the top three contenders that way, the final decision is too complex to handle in one piece.

You've got to break it down into smaller parts. We've divided our worksheet into **Software**, **Hardware**, and **Service**. By putting each of the components under the X-ray, you can make a hard-nosed, objective evaluation. First you will "rate" the various parts of each computer system. Then you will take into account the relative importance, or "weight" of each part. Finally, you will combine the weighted ratings into an overall score.



Go through all three steps,
even if one of the vendors
emerges as a clear-cut
favorite.



Where To Find The Information You Need

Where will you get the information to make the ratings? It should come from three sources:

- 1) from the RFP's the vendors have returned to you;
- 2) from attending demonstrations; and
- 3) from talking to other users.

You may be tempted to skip the last two steps. Don't. Go through all three steps, even if one vendor emerges early as a clear-cut favorite. A vendor may give all the right answers on the RFP, yet prove to be unsatisfactory when you talk to other customers or see a demo. In other words, use the RFP to see if the vendor has given the right answers. Then use other users and demos to see if he or she was telling the truth.

Still, you shouldn't have to go through the entire process for every company that wants to sell you a computer. We recommend that you narrow the field to the top three candidates before moving on to steps two and three. Then, spend the necessary time on these three vendors so you have a sound basis for comparison.

Attending Demonstrations

Your next step (before talking with current users) will be attending demonstrations of the top three contenders. Ask to see the **same** software you will be buying, running on the **same** hardware you will be buying. Don't let the vendor substitute a hard disk if you are buying floppy disk drives; or use a specially prepared demo program that will run much faster; or run your programs on a different computer than the one you are considering; or be the only one to actually sit at the keyboard and use the programs. At the demonstrations, you should find out if the software really has the features you want; if it is easy to use; the names of current users; and answers to all open questions on your worksheets.

Get several people from your company to go along. This is a great time to involve employees who will actually be using the machinery. We suggest that you

ask everyone to take notes separately for comparison after the demonstration.

Leave your checkbook at home when you go to demonstrations, but don't be afraid to negotiate. You will have more bargaining power if you begin negotiations early with several vendors simultaneously. And don't be afraid to let them know that you are talking seriously with other companies.

Our previous chapter on contracts gave you some hints on what to ask for in your negotiations. You should also be looking to shore up the weak spots in each vendor's proposal. If you like a system except for its price, concentrate on bringing the price down. Or, if you like a system except for an inadequate program, ask the vendor to make changes.



CONSUMER ALERT

Pitfall #13:

Reinventing The Wheel

As we compiled the information for this book, we were struck by the fact that first time buyers keep making the same mistakes over and over again. They could have avoided many of these errors simply by talking to people who had been there before.

Contact other computer users before you buy. They are your greatest single source of how-to information. You should be particularly interested in checking with users of the system you think you want to buy. These individuals will have a wealth of hard facts for you—and in most cases, they are delighted to share it with you.

Perhaps you are embarrassed to ask the vendor for references because you think it implies that the vendor is dishonest. Far better to live with a few moments of embarrassment than to spend thousands of dollars on an inadequate computer system.

Remember ACU's motto: It's always smart to learn from your mistakes, but it's even smarter to learn from the mistakes of others. Talk to as many users as you can before you buy.

The Moral: Don't reinvent the wheel. Protect yourself by talking to other users before you buy.

Talking To Other Users

This is the most important single piece of advice we can offer: ***Don't buy a computer system without talking to current users.*** It's quite helpful to talk to users before you start shopping, but it's absolutely crucial before making the final decision. Talk to ***at least three*** for each system under consideration.

You will probably have to get users' names directly from the vendor. Don't do business with a company that refuses to give you user references. Occasionally, a computer sales representative will arrange to accompany you to a demonstration at a customer site. That's okay, but be sure to call back and ask a few more questions when the vendor's not around.

Concentrate on "spot-checking" the vendors. Zero in on their weak spots, the areas where you have reservations. At a minimum, ask several questions in each category—software, hardware, and service:

"Did the software have bugs?"

"Did the vendor do everything that was promised?"

"How long does it take service people to arrive?"

"Did any hidden costs crop up after the sale?"

Usually, current users will give you straightforward answers about problems and

weaknesses. Still, you should keep these things in mind while asking questions:

- The user may be friends with the sales rep
- The user may consider the system an expensive mistake but be too proud to admit it
- The user may have forgotten the nightmares of the first few months



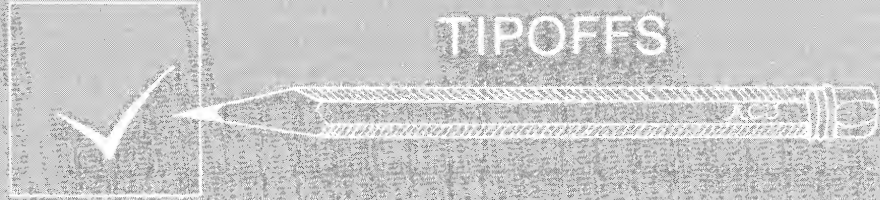
Every computer installation has problems. It's how a vendor deals with the inevitable problems that's important.



Don't be put off by a few negative remarks from a previous customer. In fact, you should be suspicious if the user paints a halo of perfection around the vendor's head. Every computer installation has problems. It's how a vendor deals with the inevitable problems that's important. Did he or she make amends immediately? Or, hem and haw and make excuses?

One final word before we explain how to use the worksheets. Many buyers hire an expensive consultant to help them make their buying decision. If you use a checklist like the one at the end of this chapter, you may not need a consultant. If you still feel uncertain, however, we suggest that you hire an expert **after** you've completed the worksheets. You don't have to pay someone \$100 per hour to do

this simple work for you. Instead, hire him or her to review your conclusions and help you with negotiations.



“Low-Ball” Bids

The Tipoff: One proposal comes in substantially under all the others.

The Ripoff: Beware of “low-ball” bids. The vendor may have under-configured the system, keeping the price down by selling you less computer power than you need. Once a foot is in the door, he or she figures you’ll have to come back to upgrade the equipment.

Some small companies underbid because they are desperate for business. You’ll be the desperate one, however, when you are left without service or support because the vendor has gone out of business for failing to take adequate profit margins.

The Solution: Examine with great care any bid that is more than 20 percent below the rest.

How To Use The Worksheets

As you go through the worksheets, give each vendor a rating for each item listed. A perfect system for your needs would get a 10 (although you will rarely encounter a “perfect” system in real life), and the others should get comparatively less, depending on how they stack up.

In essence, these final worksheets are a summary of all the preceding steps you've taken. Under software, for example, you are asked to rate "ease of use." This single rating will be a composite of all the factors explained in Chapter 7, plus what you've observed in the demos. Likewise, the rating for "completeness" will require you to judge how well each program fulfills the software shopping lists you made in Chapter 8. And under service and support, the rating "vendor reputation and reliability" will come from the dealer test of Chapter 9, and from talking to users.

Let's assume you are seriously considering three vendors. We'll call them A, B, and C. You've reviewed their RFP's, you've talked to other users and you've seen demonstrations. You are ready to use the worksheet.

You would begin with the software section. Inventory control might well be the first item on a retailer's list. If you thought vendor A's inventory control program was best, you would give it a 9. If vendor B's inventory control program was almost as good, except that it didn't have all the management reports you wanted, you might give it a 7. And if vendor C's program didn't allow for sales commissions and discounts, you might decide to give it only a 4.

You will fill out the ratings in the rest of the worksheets in the same way. The system works best if you maintain a difference of at least 5 points between the best rating and the worst and if you fill out every single blank. After completing each section of the worksheets, add up the scores and divide by the number of items to get an average rating—an average software rating, an average hardware rating, and an average service and support rating.

On the summary sheet, then enter the average scores for each system along with the price. You will notice that you are asked to enter the software score twice. According to our experience at ACU, software is twice as important as other factors. Consequently, it should weigh more heavily on the final total.

Your final step is to add up the scores and compare them to determine the "winner." There's nothing that says you have to buy from that winner, of course.

You may go back to one of the other vendors with the worksheet in hand and ask if he or she can improve on weak areas—give you a better price, for instance, or improve the service contract.

By using a decision-making system like this one, you know you'll be going into a deal with your eyes open. Indeed, "eye-opening" is the word buyers often use to describe their use of a numerical evaluation. Often their initial favorite ends up at the bottom of the heap when judged objectively.

WORKSHEET #15 (a)**SOFTWARE RATING**

Use a copy of this worksheet for each vendor you are considering. Transfer each vendor's average software rating to the summary sheet.

Vendor # ____: _____

Calculation

Final Rating

Application #1: _____

Completeness	_____
Expandability	_____
Ease of use	_____
Documentation	_____

Subtotal	_____
divide by four	_____
Average rating for Application #1	_____

Application #2: _____

Completeness	_____
Expandability	_____
Ease of use	_____
Documentation	_____

Subtotal	_____
divide by four	_____
Average rating for Application #2	_____

Application #3: _____

Completeness	_____
Expandability	_____
Ease of use	_____
Documentation	_____

Subtotal	_____
divide by four	_____
Average rating for Application #3	_____

(Continued . . .)

WORKSHEET #15 (b)**SOFTWARE RATING**

Application #4: _____

Completeness	_____
Expandability	_____
Ease of use	_____
Documentation	_____

Subtotal	_____
divide by four	_____

Average rating for Application #4 _____

Total for all applications	_____
divide by the number of applications	_____
Average software rating	_____

WORKSHEET #16**HARDWARE RATINGS**

Transfer each vendor's average hardware rating to the summary sheet.

	Vendor #1	Vendor #2	Vendor #3
<hr/>			
CPU (Central Processing Unit)			
Performance	_____	_____	_____
Ease of use	_____	_____	_____
Terminals			
Ease of use	_____	_____	_____
Printer			
Speed	_____	_____	_____
Floppy Disks			
Storage capacity	_____	_____	_____
Hard Disk			
Storage capacity	_____	_____	_____
<hr/>			
Subtotal			
divide by number of factors to get average	_____	_____	_____
Average Hardware Rating	_____	_____	_____

WORKSHEET #17**SERVICE/SUPPORT RATINGS**

Transfer each vendor's average service and support rating to the summary sheet

	Vendor #1	Vendor #2	Vendor #3
Reputation & Reliability (user comments)	_____	_____	_____
Warranty	_____	_____	_____
Maintenance	_____	_____	_____
Response time	_____	_____	_____
Terms of service contract	_____	_____	_____
Availability of custom programming	_____	_____	_____
Training	_____	_____	_____
Installation assistance	_____	_____	_____
Subtotal	_____	_____	_____
divide by number of factors to get average	_____	_____	_____
Average Service and Support Rating	_____	_____	_____

WORKSHEET #18

SUMMARY SHEET

	Vendor #1	Vendor #2	Vendor #3
Average software rating	_____	_____	_____
Average software rating (again)	_____	_____	_____
Average hardware rating	_____	_____	_____
Average service and support rating	_____	_____	_____
Subtotal	_____	_____	_____
divide by four to get average	_____	_____	_____
Final rating (1st, 2nd, 3rd)	_____	_____	_____
Price	\$ _____	\$ _____	\$ _____

From Computerese To Computer-ease In Simple Installments

The hardware basics you've already learned should be enough to get you through most situations. You may, however, need to understand some of the words in this last installment when speaking with programmers or sales representatives.

More Hardware Terms

Interface. As a verb, the process of connecting. As a noun, the connection between two parts of a computer system, or between two computers. It is usually a plug, a socket, a cable or all three. There are several standard interfaces in use.

LPM. Lines Per Minute. One way of measuring the speed of a computer printer.

Minifloppies. Standard floppy disks are 8 inches in diameter. Minifloppies measure 5¼ inches. They are widely used in personal computers.

Modem. A device that translates the electrical impulses from a computer into sounds that can be sent over a telephone line. At the other end, a similar modem translates the sounds back into electrical impulses. In this manner, two computers can talk to each other over the phone.

Parallel Interface. You will recall that a letter, number or symbol is stored in a computer as a byte. A byte consists of 8 bits. When transmitting data, a parallel interface uses 8 side-by-side signal wires to send all 8 bits simultaneously.

Peripheral. Any piece of computer equipment that attaches to the central processing unit. Terminals, printers, disk drives and modems are all peripherals.

RS-232 Interface. A widely used standard for serial interfaces, which defines the electronic format of the message as well as which wires go to which pins in the connector.

Serial Interface. Letters, numbers and symbols are stored in computers as bytes, which are composed of 8 bits. A serial interface uses a single signal wire to send each bit one at a time.

(Continued . . .)

Thermal Printer. Uses heat to form letters on specially treated paper. Inexpensive and quiet, but usually not practical for business use because the paper (1) deteriorates over time, (2) is difficult to photocopy, and (3) is not suitable for letters to the public.

Winchester Drives. A type of hard disk. IBM originally developed this technology, which involves a rigid disk hermetically sealed inside a housing. Because of its reliability, speed and small size, it is used for most hard disks supplied with small systems today.

Afterword



It's always smarter to learn from your mistakes. It's even smarter to learn from the mistakes of others.

Congratulations!

If you've gotten this far, you have accomplished something very few computer buyers manage to do: You have prepared yourself properly **before** the purchase was made. Most of the time, such preparations will eliminate the frustrations and financial dangers of buying a small computer.

Although we have tried to make this volume as complete as possible, we realize

you may still have questions as you shop for a small computer. We urge you to consider membership in the Association of Computer Users and to call on us with your further questions.

In addition, you may wish to refer to our companion volume, ***How To MANAGE Your Small Computer . . . without frustration.*** It passes along time-tested techniques from ACU's members, techniques that allow you to get full value from your computer:

- How to guarantee a hassle-free installation
- How to overcome your staff's computerphobia
- How to find, hire, train and motivate DP personnel
- Why, when and how to upgrade
- How to sell excess computer capacity for bonus profits
- And many other ways to learn and benefit from the experiences of other users.

Happy computing!

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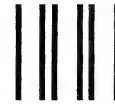
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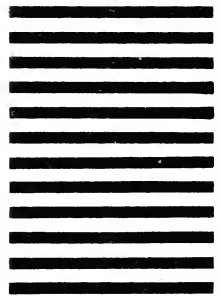


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How To Select Your Small Computer ... without frustration

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Roger C. Levit
Consultant
Santa Rosa, CA

ABOUT THE AUTHORS

Hillel Segal is president and founder of the Association of Computer Users (ACU). He is author of the COMPUTER FITNESS NEWSLETTER published by the Association, editor of ACU's BENCHMARK REPORTS, and a recognized authority on the effective selection and management of small computers.

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